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By

RICHARD ELWOOD DODGE

Professor of Geography, Teachers College, Columbia University, New York City; co-editor of The Journal of Geography; and author of "A Reader in Physical Geography for Beginners"

PART I

THE PRINCIPLES OF GEOGRAPHY

PART II

COMPARATIVE GEOGRAPHY OF THE CONTINENTS

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CAROLINE W. HOTCHKISS, Seventh Grade, Horace Mann School, Teachers College, New York.

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THE PREFACE

THIS book has been written with the idea of emphasizing the "causal notion" in geography teaching. The first part, called "The Principles of Geography," treats of those phases of general geography which are necessary as a foundation for an intelligent and disciplinary study of the several continents from the causal standpoint. The significance of these topics in the later study of human geography is illustrated, wherever possible, by simple examples of the dependence of life on the physical environment, so that the pupils and the teachers may realize that these introductory chapters are important and necessary.

In that portion of the book devoted to the geography of the continents these principles are used and applied in the interpretation of life conditions. In each country the physical features, the animals, and the plants are described first so that the causal facts may be used as a basis for an understanding of the life consequences presented in the sections devoted to man and his work. The larger principles of Part I. are referred to frequently. Such cross references afford the best kind of review because the topics are taken up from another standpoint.

In the treatment of the physical features of continents and countries, references to the life consequences are included whenever any particular point is of wide significance. In the choice of physical topics to be introduced in the principles, preference has been given to those which are of the broadest application. For this reason greater attention has been given to climate than is usual in school geographies, while only those land forms have been treated which are needed in the later work. The climate of the world is studied from the standpoint of the wind systems. There is a closer relation between wind systems and human conditions than between heat belts and human conditions; hence there can be a better causal study of the climate of the world from the standpoint of the wind systems than from any other.

The last chapters in Part I. are devoted to a summary of the elementary principles of commerce so that pupils may understand the reasons for the details of commercial geography presented later.

In Part II. special emphasis is given to commercial geography because it is believed that this study deserves an important place in elementary school work. The endeavor has been not simply to present the dry statistics of commerce, which change rapidly, but also to show the relative commercial importance of the leading countries, the interrelation of the different countries commercially and the reasons therefor, especially so far as those reasons are geographically determined.

The book closes with a summary of the world's commerce and industry so as to bring the relative commercial importance of the leading nations clearly to the front in a brief review.

The "Questions and Exercises" have been prepared by Miss Caroline W. Hotchkiss, who for several years has made use of such questions in her teaching of geography in the Seventh Grade of the *Horace Mann School, New York City.* These questions are planned to make pupils think, to test their thoughts, and to give the best training in the study of maps and collateral reading.

It is believed by the author that pupils should gain from their school study an ability to learn more geography after their formal schooling has ceased. They should be able to use a map or an atlas and the more common books of reference.

Maps. The attention of geographers and geography teachers is especially invited to the large number and the excellence of the maps, all of which have been made especially for these geographies. Each continent and the United States is represented by three maps, a *physical map*, showing in accordance with the international color scheme, the land heights and the water depths; a *political map*, giving the latest information in regard to boundaries and other varying points, and a *commercial map*, showing the distribution of the leading commercial products, the routes of domestic commerce by land and water, and the principal oceanic routes.

The drawings for the maps have passed under the critical eye of Dr. J. Paul Goode, *Assistant Professor of Geography in the University of Chicago*, an expert in cartography.

Proper Names. For the spelling of all proper names in the United States and its dependencies, the decisions of the United States Board on Geographic Names have been followed, both on the maps and in the text. In the case of all other proper names the rulings of the Royal Geographical Society of London have been followed. At the heads of the different chapters devoted to the several sections of the United States the abbreviations for states, as authorized by the United States Post Office Department, are inserted for reference.

Illustrations. The illustrations have been chosen with care for their teaching value. They should be studied in association with the text and the maps, and may well be used as a basis for review questions in almost every chapter. They are largely from private collections, and thanks are especially due the following: Professor Francis E. Lloyd, Miss Ida E. Robbins, Miss Mary E. Calhoun, Miss Caroline W. Hotchkiss, and Miss Katherine Cochrane, all of the *Teachers College, New York City;* Mrs. E. P. Telford, Brooklyn, N. Y.; James B. Carrington and Mrs. C. M. Benson, New York City; George B. Reynolds, Evanston, Ill.; Wilifrid F. Beardsley, Evanston, Ill.; Reverend Sydney Strong, Oak Park, Ill.; Reverend J. F. Loba, Evanston, Ill.; the Atchison, Topeka & Santa Fe Railroad, Chicago, Ill.; David Goodale, Gleasondale, Mass.; Illinois Steel Company, South Chicago, Ill.; the Canadian Government; the Northern Pacific Railroad, St. Paul, Minn.; the Guatemala Coffee Company, Chicago, Ill.; the Department of Agriculture and the United States Geological Survey, Washington, D. C.; the American Museum of Natural History, New York City, and the Field Columbian Museum, Chicago. A number of the illustrations have been secured from the Detroit Photographic Company of Detroit, Mich., and the animals are nearly all from photographs taken and furnished by the New York Zoölogical Park.

Critics. In the preparation of these books the author has had the critical assistance of Dr. J. Paul Goode, *Assistant Professor of Geography in the University of Chicago*, and Miss Ellen C. Semple, Louisville, Ky., author of "American History and its Geographic Conditions." Doctor Goode, as an authority on cartography and economic geography, and Miss Semple as an author and student of anthropogeography, and both as successful teachers, have been able to give extremely valuable aid.

Each book has also had the criticism of two special critics who are successful teachers in the grades to which the book pertains. The special critics for this book are Miss Caroline W. Hotchkiss of the Seventh Grade of the *Horace Mann School, New York City*, and Miss Elizabeth Smith of the *Chicago Normal School.* Both of these teachers have been eminently successful in teaching geography in the upper grades, and have given valuable criticisms.

Among the other critics who have reviewed the text with care and offered many valuable suggestions are Superintendent C. N. Kendall, *Indianapolis, Ind.;* Miss Zonia Baber, of the *School of Education, the University of Chicago;* Professor D. C. Ridgeley of the *Illinois State Normal University, Normal, Ill.;* Professor M. S. W. Jefferson of the *State Normal College, Ypsilanti, Mich.;* Professor J. F. Chamberlain of the *Normal School, Los Angeles, Cal.;* Professor A. W. Farnham of the *Normal School, Oswego, N. Y.;* Professor E. D. Jones of the *University of Michigan, Ann Arbor, Mich.;* Superintendent L. C. Brogden of *Kinston, N. C.*, and Mr. S. Y. Gillan, Milwaukee, Wis.

The thanks of the author are due to his colleague, Miss Clara B. Kirchwey, who has given attention to the procuring of the illustrations and who has prepared the suggestions for collateral reading.

Suggestions and detailed criticisms will be welcomed by the author.

RICHARD ELWOOD DODGE.

Teachers College, Columbia University, New York City, August, 1904.

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DODGE'S ADVANCED GEOGRAPHY

PART I

THE PRINCIPLES OF GEOGRAPHY

I. INTRODUCTORY

The Meaning of Geography. The study of geography is the study of the earth and its relation to the plants, animals, and men that live on its surface. When we are learning about the climate and the people of the tropical forests of Central Africa or the Philippines, or about the explorations of Nansen or Peary in the far north, we are studying geography.

When we look for spring flowers on the sunny, sheltered side of a hill rather than on the north side, or when we walk on the sunny side of the streets in winter and on the shady side in summer, we are making use of our knowledge of geography.

Geographical Facts and Principles. Our study of geography shows us that certain facts are much more important to learn and to remember than others, because some are permanent while others are constantly changing. For instance, the population of New York City or Chicago, or any other large place, changes daily; hence there is little to be gained from remembering the exact number of inhabitants in any city at a certain date. On the other hand, the location, climate, soil, slopes, and drainage which have led men to build large cities at the places mentioned, are practically unchanging and therefore important. Before the white man came the Indians occupied the island on which New York City stands, and for exactly the same reason, because it was a convenient place to gain their living. Such truths as this are more than mere facts. They are *principles*, for they are true without regard to time or place.

A knowledge of geographical principles, therefore, will enable us to understand why men live and act in certain ways in one part of the world, and in different ways in another.

The Value of Geographical Principles. In the first part of this book we are to study the more important principles of geography, for they will help us to understand the geographical conditions of the world. Principles, or generalizations, are worked out through the study and comparison of many facts. We can understand the principles only when we know many facts from different parts of the world which serve to illustrate the principles.

For instance, we shall find the soil, the drainage, and the climate of the coastal areas of South Carolina, Louisiana, and Texas to be much alike. We shall also find that these three states raise great quantities of rice. We may then very rightfully say that wherever the conditions in other parts of the world are like those in these regions, rice can easily be raised. With this principle in mind it is not difficult to find out the possible rice-producing areas from a study of the maps and the text. In other words, a knowledge of the geographical conditions in one part of the world will help us to understand the conditions in another.

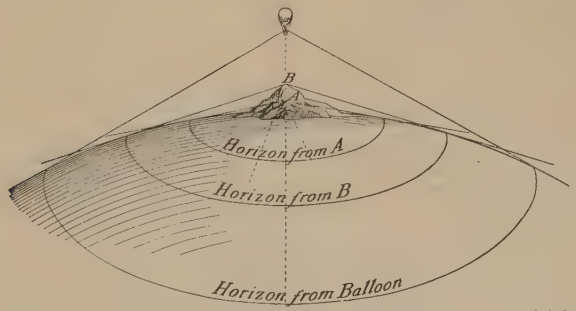

FIG. 1. *A diagram showing the different horizons which may be seen from different elevations.*

II. THE SHAPE AND SIZE OF THE EARTH

The Materials of Which the Earth is Composed. The earth is a large globular mass of matter, the outer portion of which is made of rock. In the larger depressions of the rock surface there are great volumes of water, and over all is the air. The rocks, the water, and the air are held in their relative positions because they are constantly drawn toward the center of the earth by the force which we call gravity. The heavy rocks form the central mass, while the water, which is heavier than air but lighter than rock, is drawn as near to the center of the earth as the rock will allow it to go. It is the attraction of gravity that keeps movable objects from falling off into space.

FIG. 2. *A steamer leaving New York Harbor.*

The Shape of the Earth. The globular earth is so large that we can see very little of its surface at any one moment, and that little appears flat. If we climb a tree or go up on a housetop, we can see more of the earth's surface than we can from the ground. From a high mountain we can see still more. (See Fig. 1.) Mountain tops are therefore frequently visited for the view they command, and high lookout towers are sometimes built on plains for the same purpose. In all places, however, we see a line in the distance where the earth and sky seem to meet. That line is known as the *horizon.*

A ship on the sea as it moves away from us will disappear over the horizon; that is, it passes over so large a part of the earth's surface that it gets out of sight on account of the earth's curvature. (See Figs. 2, 3, and 4.) The last sign of a steamship leaving port is the smoke, which has risen so high in the air that it is still visible when the vessel itself has disappeared. (See Fig. 5.)

The curvature of the earth is everywhere such that an object five feet in height is out of sight at a distance of four miles. If this were true in one direction only, we could merely say that the earth is cylindrical like a round tin can. But it is equally true in *all* directions. Therefore the shape is spherical, and the earth is a globe or sphere. The shape of the earth is also proved by the fact that the shadow of the earth cast upon the moon is always circular. (See Fig. 6.) As a sphere is the only body that always casts a circular shadow, the earth must be spherical.

FIG. 3. *A telephoto picture of the same steamer six miles distant. Notice that the vessel is disappearing behind the curvature of the earth.*

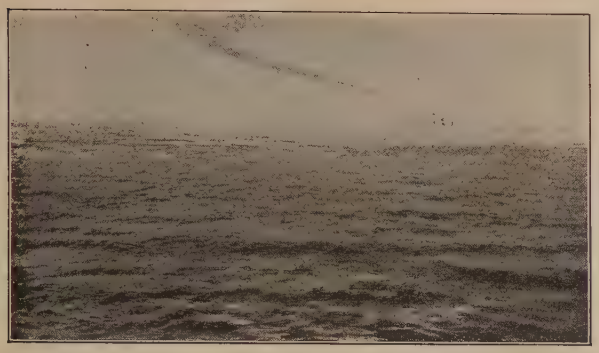

FIG. 4. *A telephoto picture of the same steamer about twelve miles distant.*

The Importance of the Shape of the Earth. The earth is not exactly a sphere, but is so nearly one that only careful study can detect the difference. It is of little importance to us that the earth is not quite spherical, but the fact that it is practically so is of great importance, for, owing to its shape, the attraction of gravity is nearly the same in all parts of the world. Because of the nearly equal attraction of gravity a man can walk over the level surface with the same ease everywhere. The birds can migrate from one part of the world to another without difficulty because their muscles are able to move their weight anywhere. Steam vessels and railroad trains end their journeys with the same weight of freight as when they started.

FIG. 5. *A telephoto picture where the same steamer is about twenty miles distant. Only the smoke is visible.*

Owing to the attraction of gravity, water or any other liquid is drawn toward the center of the earth until it is *level*. When we refer to a surface of large area, as the surface of a large lake or the sea, as being level, we do not mean that it is flat like a floor. We mean that it has no curvature other than the general curvature of the earth's surface.

By *up*, we mean away from the center of the earth. So people on the opposite side of the earth stand with their feet down and their heads up just as we do.

The Size of the Earth. The earth is so large that people living in different parts of the same country often know very little about each other. In modern times the use of locomotives and steam vessels has made it possible to reach nearly all parts of the world with comparative ease. For this reason the earth does not seem so large as it once did.

The *exact* size of the earth is of no great importance to us. To know that it is about 25,000 miles in circumference gives us some idea of the length of time required to go around it in a fast steamer, traveling 500 miles a day, if we could follow a straight path. But, as we have learned, the earth is not quite a sphere, and the longest distance around it in a north and south direction is forty-two miles less than the longest distance around it in an east and west direction. This difference is too small to be shown by a globe or by any drawing we can make. A perfect globe illustrates the shape of the earth accurately enough. (See Figs. 7 and 8.)

Questions and Exercises

(1) When a sailor is approaching land does he see the base or the summit of a hill or tower

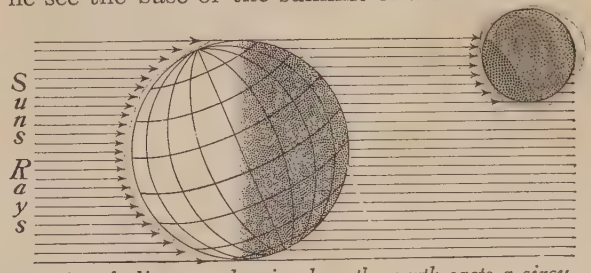

FIG. 6. *A diagram showing how the earth casts a circular shadow on the moon.*

FIG. 7. *The Western Hemisphere which contains North and South America.*

FIG. 8. *The Eastern Hemisphere which contains Eurasia, Africa, and Australia.*

first? Give the reason. (2) Draw a picture of a ship coming into a harbor, and show how the curved surface of the earth is illustrated by what a person on the shore sees. If you live on a level prairie, make another drawing to illustrate the same principle. (3) Draw a picture showing some experience of your own illustrating the curved surface of the earth. (4) How much of the earth's surface have you seen at one time? Where were you and what did you see? (5) At sea does the surface of the ocean look flat or curved? Why? (6) Which diameter of the earth is longer, the equatorial or the polar? (7) Does the fact that men have sailed around the earth show that it is spherical and not egg-shaped? (8) Write in brief sentences what you have learned about the size and the shape of the earth.

III. THE MOTIONS OF THE EARTH

Kinds of Movements. The great globe on which we live is constantly in motion. It turns on its axis or *rotates* once in twenty-four hours, and it moves through the heavens or *revolves* around the sun in a fixed path once a year.

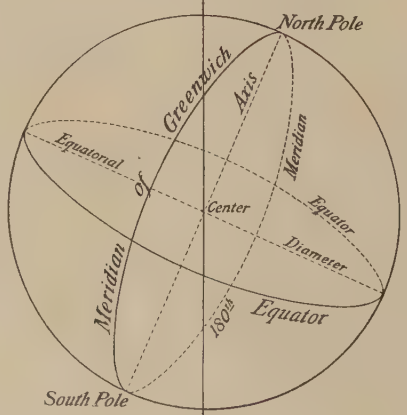

FIG. 9. *A diagram of the earth showing the axis, the equator, the prime meridian, and the poles.*

Rotation; the Earth's Axis; the Poles. The earth rotates daily on an *axis* or central line. (See Fig. 9.) The two extremities of this line on the earth's surface are known as the *Poles*. The pole nearest the North, or Pole-star, is known as the *North Pole*. (See Fig. 10.) The opposite pole is the *South Pole*. If we watch the stars in the northern sky on any night we see that certain stars, forming what is known as the Big Dipper, seem to swing around the Pole-star. The two stars farthest from the handle are called the *pointers*, because a line connecting them always points toward the Pole-star. (See Figs. 10 and 11.)

If one could stand at either pole, he would simply be turned around once in twenty-four hours; his body would not move forward at all. This is well illustrated by an engine on a turntable. The cow-catcher and the rear of the tender have to be swung through a long distance in order to turn the

engine halfway round, while the middle of the engine is always over the same spot. In the same way points on the earth at a distance from the poles have to pass through a greater space in a day than points near them, and hence rotate more rapidly.

The Equator; the Hemispheres. Halfway between the poles there is a line of places which have a faster rotary motion than any other part of the world. These points, equally distant from the poles and having the most rapid rotary motion, form the *equator*. The half of the world north of the equator is called the *Northern Hemisphere* and the other half is known as the *Southern Hemisphere*. (See Fig. 12.)

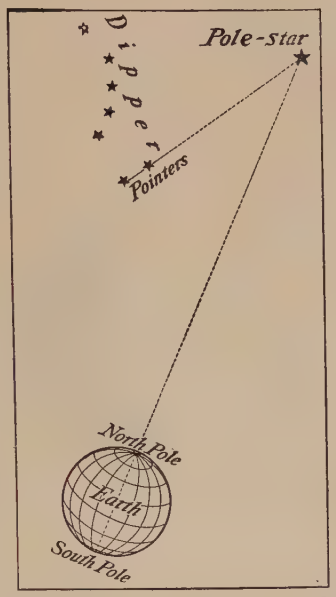

FIG. 10. *The axis of the earth and the pointers are each in line with the Pole-star.*

Directions on the Earth. As a result of the earth's rotation we have certain easily determined directions on the earth. A line pointing toward the poles is a north-south line, and a line at right angles to this is known as an east-west line. The points toward which these lines are directed, namely, north, east, south, and west, are called the *cardinal* points, and can be determined at night by finding the Pole-star. Even uncivilized people know and use these four points.

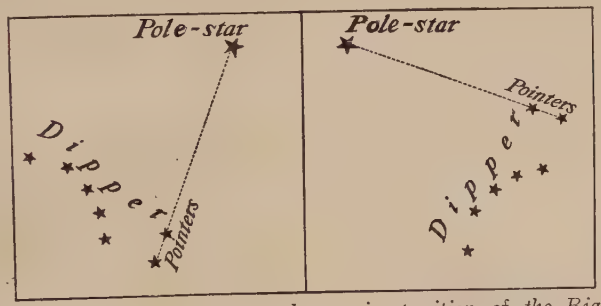

FIG. 11. *The apparent change in position of the Big Dipper in six hours. It seems to revolve around the Pole-star every twenty-four hours.*

FIG. 12. *A diagram of the earth showing the equator and the hemispheres.*

The Compass. Any one who has lived in the open fields or in the forests, or who has been a sailor, can usually tell direction by means of the sun or stars. Most people, however, find it more convenient to use a compass. (See Fig. 13.)

The compass is an instrument with a magnetic needle supported so as to swing about a point. A magnetic needle will always come to rest so that one end points toward the *North Magnetic Pole*. If the north pole and the magnetic pole were the same, the compass would tell us the true north. The north magnetic pole, however, is in northern Canada, and is some distance south of the north pole. (See Fig. 173.) Hence, it is necessary to know how much a compass varies from the true north, if we wish to measure direction accurately by means of it. When the sun shines the cardinal points can be found by means of a common watch. Hold the watch in a horizontal position and point the short hand toward the sun. The south point of the dial

FIG. 13. *A compass.*

will then be halfway between the short hand and the XII. mark.

Daylight and Darkness. The earth, in its daily rotation, turns from west to east, so that the sun *seems* to move from east to west. The rate of rotation of the earth is usually measured by means of the sun. As the earth rotates toward the east, the place where we live turns first into sunlight and then into shadow, giving us day and night. (See Fig. 14.) Just before the sun appears in the eastern part of the sky and just after it disappears in the western part, we have *twilight*.

FIG. 14. *Day, night, and twilight on the earth's surface.*

During twilight the sun is shining through the upper air, and the light of the air is reflected to the earth, making it partly light, or twilight. The constant change from day to night and night to day is therefore due to the earth's rotation.

Meridians. When the sun is over a north-south line passing through our home, we say it is *noon*. This line, if extended, would pass through the north and south poles, and is known as a *meridian*, or midday line. The earth must make a complete rotation to bring the sun over our meridian again and complete a day.

Every place to the east or west of us is on a different meridian from ours, and has its noon at a different time from ours, because the sun cannot be over more than one meridian at a time. The sun passes a meridian to the east of us before it is over our meridian, and hence places to the east have their noon earlier than ours, and places to the west have theirs later. It would be inconvenient to distinguish as many meridians as there are north-south lines over the earth's surface, so 360 meridians are generally used, as a circle is commonly divided into 360 parts or degrees. (See Fig. 15.)

Longitude and Time. One meridian, that passing through Greenwich, England, is known as the *prime meridian* or *zero meridian*, and time all over the world is compared with Greenwich time. (See Fig. 16.) We describe the position of places to the west of Greenwich as being in *West Longitude*, and to the east of it as being in *East Longitude*. (See Fig. 15.)

As it takes the earth twenty-four hours to make a complete rotation, the sun seems to pass over fifteen degrees of the complete 360 degrees of the earth's circumference each hour. (See Fig. 15.) Therefore points which are fifteen degrees apart vary in time by one hour. Time is reckoned the world over by means of the meridians. Shipmasters all carry clocks or chronometers which tell Greenwich time, and when it is noon where they are, which they can tell by observing the sun, they find out by their chronometers what time it is at Greenwich, and thus learn how far east or west of the meridian of Greenwich they are.

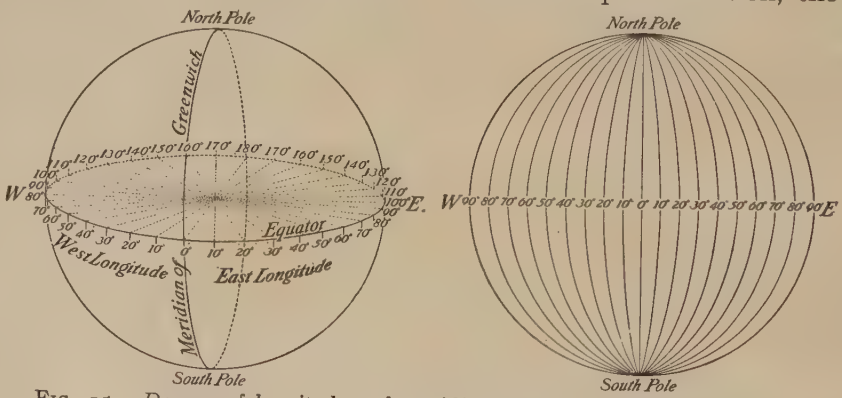

FIG. 15. *Degrees of longitude and meridians by means of which places are located as east or west of the meridian of Greenwich.*

For example, suppose it is noon at Greenwich, it is then midnight one-half way around

the world from Greenwich; that is, on the 180th meridian. At the same moment at all points west of Greenwich to the 180th meridian it is some hour between midnight and noon (that is forenoon of the same day), while in the opposite direction it is some hour between noon and midnight (that is afternoon of the same day). When it is noon at Greenwich a new day is beginning at the 180th meridian. As the noon hour moves west from Greenwich, the new day moves west from the 180th meridian until in twenty-four hours midnight again occurs at the 180th meridian and a new day begins.

When it is noon at New Orleans on the 90th meridian, west longitude, it is six o'clock in the evening at Greenwich and six o'clock in the morning of the next day on the 180th meridian. When it is Tuesday noon at New Orleans, it is Tuesday evening at Greenwich and Tuesday midnight at ninety degrees east longitude. The next moment Wednesday begins at ninety degrees east longitude; it continues its journey westward and in six hours will reach Greenwich.

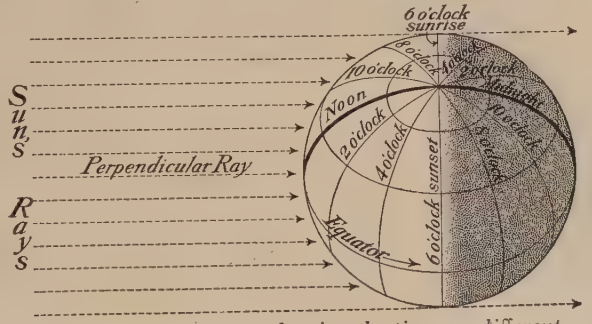

FIG. 16. *A diagram showing the time on different meridians when it is noon at Greenwich.*

The International Date Line. The above paragraph has shown us that there is a difference in date between Greenwich and the 180th meridian, as, when it is Thursday afternoon at Greenwich it is Friday forenoon at the 180th meridian. The 180th meridian passes through the Pacific Ocean, where there is little land, so that few people except sailors are bothered by this change in date. There are a few groups of islands, like our Aleutian Islands, however, which are on both sides of the 180th meridian. As it would be inconvenient for a part of these islands to use a different date from the rest, it has been agreed that the day shall not change everywhere at the 180th meridian, but along an irregular line shown on the map (see Fig. 119) and known as the *International Date Line*. This line has been drawn so that no two neighboring regions belonging to the same country shall have different dates at the same time.

If you were on a steamer going from San Francisco to Japan, it would be necessary when the steamer crossed this line for you to change your reckoning exactly one day; for instance, if you reached the line on Monday noon, after crossing the line you would have to call it Tuesday noon. If you were going in the opposite direction, you would have to call it Sunday noon.

Questions and Exercises

(1) Draw a circle two inches in diameter to represent the earth. Indicate the Northern Hemisphere; the Southern. Draw a line to represent all the places in your hemisphere which have the same speed of rotation as you. What will you call this line? To what is it parallel?

(2) Take a sheet of blank paper such as you use for your school exercises and place on a table which has no iron near it; see that the long sides are parallel with the long sides of the room. Draw a small oblong to represent your teacher's desk. Draw another to represent your position in the room. Without moving the sheet from its position, draw a north and south line through the center of the sheet and cross it with an east and west line. Use colored pencils for your work, and make the sheet attractive. In which directions do the long sides of the room run? Which direction do you face? (3) With the help of a good compass and a ruler, draw your meridian line on the floor of your schoolroom. Find out the magnetic variation at your home, so that the line shall be exactly right.

(4) Locate the magnetic pole. In which direction would the compass needle point if you stood north of the magnetic pole?

(5) Look for the Pole-star to-night. Find the Big Dipper and draw a diagram to show its position with regard to the Pole-star.

(6) Point a cane or pointer through an open window at the Big Dipper or some familiar group of stars near the Pole-star. Do this by holding your eye at one end of the cane, noting just the place among the stars to which it points. Arrange the pointer so that it shall not move, and make another observation an hour after the first. If possible, make three observations an hour apart. Report on what you have noted with regard to the apparent movement of these stars. Give the reason. Do the same with the moon.

(7) Observe the direction and length of your shadow at 9 A. M., 12 M., and at 5 P. M. Draw a picture illustrating your observations. In what direction does your noon shadow point? When is your shadow shortest? How could you easily find north if you were lost without a compass? (8) When it is noon at your home, what time is it on a meridian fifteen degrees to the west? To the east? When it is noon at New Orleans, what time is it at Memphis? When it is noon at Cairo in Africa, what time is it at Natal in Africa? (9) In what direction is the shadow of the Washington Monument, Washington, D.C., pointing at this moment? The shadow of the obelisk in front of St. Peter's at Rome? The Bunker Hill Monument, Boston?

(10) Over how many degrees of the earth's surface does the sun pass in twenty-four hours? In one hour? (11) Locate Greenwich. (12) On which meridian is Calcutta? New Orleans? Your home? (13) Trace the International Date Line. What time is it on that line when it is noon at Greenwich? (14) Suppose when it is noon on some ship at sea its chronometer shows time at Greenwich to be 3.30 P. M. In what longitude is the ship? (15) Name three cities in east longitude; three in west longitude. (16) What time is it now in the Philippines? In Hawaii? At Greenwich? At Tokyo?

IV. THE MOTIONS OF THE EARTH (*Continued*)

Revolution. The other great motion of the earth, that about the sun in the course of a year, is known as *revolution*. The earth, rotating or spinning all the time, circles around the sun much as a spinning top sometimes moves about the floor. The earth does not spin like the top with its axis straight up and down, but with it inclined to the plane in which it moves at the angle shown in accompanying figure. (See Fig. 17.) This angle of inclination from the perpendicular is 23½ degrees, or a little more than one-fourth of a right angle. As the earth moves about the sun in a nearly circular path, the north pole first leans toward the sun. When the earth has reached the opposite position in its course the north pole leans away from the sun. That is, each pole is at one time in the sunlight and then, six months later, in the shadow of the earth. In order to make this motion clear, thrust a knitting needle, or long hat pin, through an apple from bloom end to stem end. Then tilt the needle to the proper angle and move it and the apple about some central object representing the sun. It will then readily be seen that though the needle always points in the same direction, as does the earth's axis, it leans toward the central object when in one position

FIG. 17. *Position of the earth in its orbit each month. Notice that the axis always points in the same direction.*

and away from it when in the opposite position, just as the poles of the earth do.

The distribution of sunlight over the earth therefore changes constantly, and as a result we have different seasons. (See Fig. 17.) The best method of illustrating the way the earth is lighted by the sun is by means of a globe and a light in a darkened room. In whatever position the globe is held it will always be half in the light and half in the dark. The boundary between the dark and the light side will be a circle dividing the globe into halves. This circle on the earth is called the *twilight circle*, because it marks the boundary between day and night. The twilight circle always cuts the equator in halves; hence daytime and night at the equator are always equal, each twelve hours in length. (See Figs. 18, 19, and 20.)

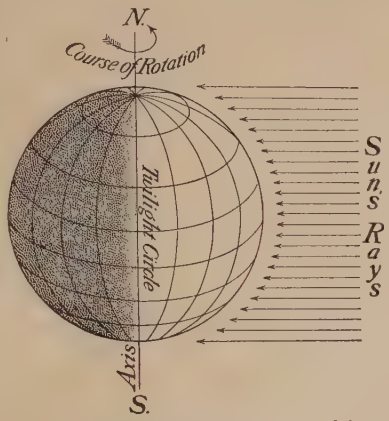

FIG. 18. *The sun's rays reaching both poles at the equinoxes.*

The Equinoxes. When the sun is directly overhead, or *in the zenith*, at the equator, the twilight circle passes through the poles, the days and nights are equal in length throughout the world, and all the earth is lighted in each twenty-four hours. This occurs on the twenty-first of March and the twenty-second of September, and hence these two dates are known as the *equinoxes*, or the times of equal days and nights. (See Fig. 18.)

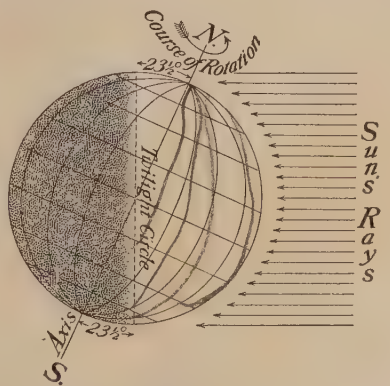

FIG. 19. *The sun's rays reaching 23½ degrees beyond the north pole at the summer solstice.*

Summer and Winter. As the earth moves along in its course from the twenty-first of March the north pole leans more and more toward the sun, until it reaches its extreme position on June twenty-second. Then the sun shines 23½ degrees beyond the north pole. At this time it also fails to reach the south pole by 23½ degrees. Thus, there is at this season a circular area about the north pole which is continually in sunlight and one about the south pole which is continually in darkness. (See Fig. 19.) Six months later, that is, on the twenty-second of December, the conditions are reversed; the south pole leans toward the sun and the north pole away from it. Then the south polar area is in sunlight continually, the north polar area in darkness, and the sun's rays strike the earth vertically at noon 23½ degrees south of the equator. (See Fig. 20.)

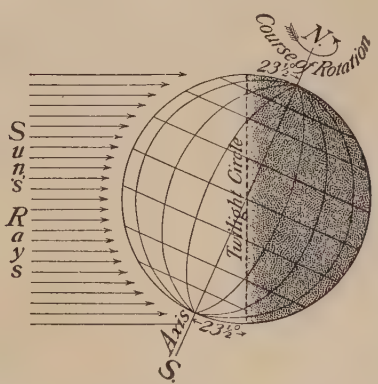

FIG. 20. *The sun's rays reaching 23½ degrees beyond the south pole at the winter solstice.*

Between the twenty-first of March and the twenty-second of September the larger part of the lighted half of the earth is in the Northern Hemisphere, and the days in that hemisphere are everywhere longer than the nights. In the six months from the twenty-second of September to the twenty-first of March the days in the Southern Hemisphere are similarly longer than the nights. Thus, the Northern Hemisphere has summer while the Southern Hemisphere has winter, and it has winter while the Southern Hemisphere has summer. In the Southern Hemisphere the

sports that are indulged in at the Christmas season are those we enjoy in midsummer.

Circles and Tropics. The boundary lines of the polar areas are therefore circles 23½ degrees from either pole and marking the extreme limit of the sun's rays on the twenty-second of December in the Northern Hemisphere and on the twenty-second of June in the Southern Hemisphere. These two circles are therefore important lines and are known as the *Arctic* and *Antarctic Circles*. (See Fig. 21.) The northern and southern limits of the vertical sun are known as the *Tropics*, from a word meaning "to turn," because the vertical rays first advance toward these lines and then recede. The tropic in the Northern Hemisphere is known as the *Tropic of Cancer*, and that in the Southern Hemisphere as the *Tropic of Capricorn*. (See Fig. 21.)

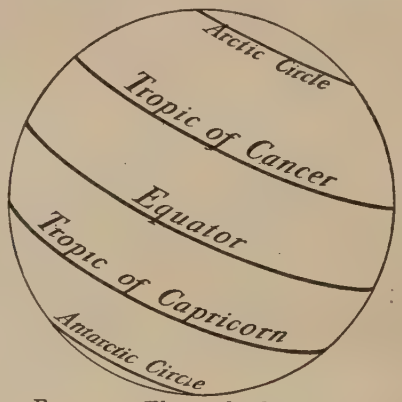

FIG. 21. *The earth, showing the principal circles.*

Zones of Sunlight. Between the Tropic of Cancer and the Tropic of Capricorn lies the Tropical Zone of Sunlight, within which the sun is always vertical somewhere. It is vertical at every place in this zone, except the tropics themselves, twice a year—once as the vertical rays move north and once as they move south.

Between the circles and the tropics are two areas, known as the *Temperate Zones of Sunlight*. In these regions the sun shines every day, but it is never directly overhead. Near the tropics it is almost overhead in summer, while near the circles it is very low in the sky in winter, so that its rays cast long shadows and give little warmth. In our spring months the sun rises higher and higher in the heavens each day and the days grow longer. In the autumn months it sinks lower and lower and the nights grow longer. At the poles there are six months of darkness and six months of daylight. At the equator, as we have seen, there are always twelve hours of daylight and twelve hours of darkness. Everywhere else the days and nights are unequal in length except on the twenty-first of March and the twenty-second of September, when the days and nights are of equal length the world over.

Latitude. We have already seen how the rotation of the earth enables us to make use of the sun in calculating time and in finding how far east or west of the meridian of Greenwich we are. In this way we get our longitude by the sun. A knowledge of how the earth rotates and revolves also enables us to tell how far north or south of the equator we are. Our position with reference to the equator is known as our *Latitude*. Thus, by knowing our position with reference to the north-south Greenwich meridian and the east-west equator, we can find our exact position on the earth.

The latitude of a place is most easily found by locating the position of the Pole-stars in the sky. A person standing at the equator would see the North Star on the northern horizon and the Southern Cross nearly on the southern horizon. If a person could reach the north pole, the North Star would be in the zenith. Everywhere between, there would be a different angle between the plane of the horizon and the line from one's eye to the North Star.

At the equator, where the North Star appears on the horizon, the latitude is zero degrees. The distance between either of the poles and the equator is one-fourth of the circumference of the globe; that is, one-fourth of 360 degrees, or ninety degrees. At the poles, therefore, the latitude is ninety degrees, and at all places between the poles and the equator it is somewhere between zero degrees and ninety degrees.

Everywhere in the Northern Hemisphere the latitude may be found by measuring the angle between the Pole-star and the horizon. We can use latitude to measure distance, because we know how large the world is and can divide the distance from the pole to the equator into ninety parts, each of which is a degree in length. (See Fig. 22.) The average length of a degree of latitude is 69.09 miles.

Parallels of Latitude. All points the same distance from the equator have the same latitude, and may be imagined to be joined together by a line, just as the places which are at the greatest distance from the poles are imagined to be joined by a line known as the equator. All of these lines would be parallel to the equator and are, therefore, called *parallels*. (See Fig. 22.) The parallels that are the most used are those which are ten degrees of latitude apart, just as the meridians most used are those ten degrees apart. By knowing our position with reference to the crossing of a meridian and a parallel we know our position on the earth, just as in cities our street and number tells us our position north, south, east, or west of certain streets chosen as starting points.

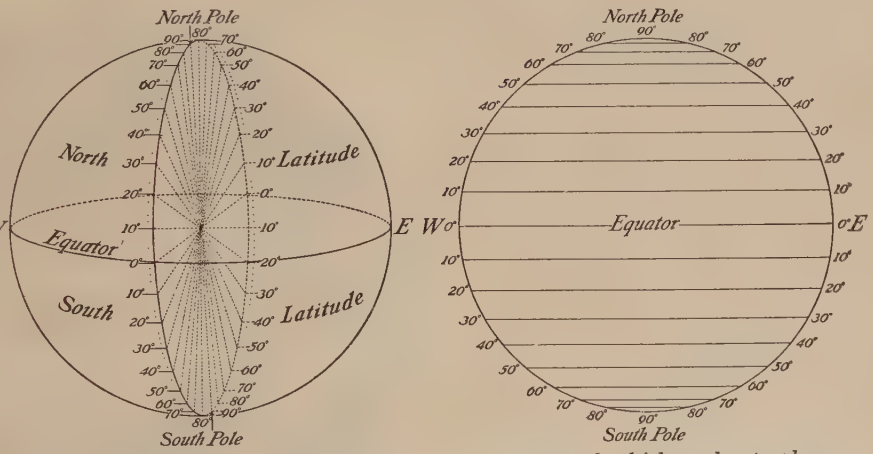

FIG. 22. *Degrees and parallels of latitude by means of which we locate places with reference to the equator.*

Latitude and longitude are very important, especially in the great plains of the world or on the ocean, where no one would know his position unless he could calculate it from the stars. Sailors the world over therefore find their latitude and longitude frequently.

Maps and Map Scales. Latitude and longitude are of great importance to all people who use maps, because all maps are drawn to show the position of places in the world by their latitudes and longitudes. Any map is a plan showing the position of objects on a part or the whole of the earth's surface.

Maps drawn to show in a detailed way the features of a small section, like city or town maps, or the plan of a farm, are very much easier to draw and to read than are some of the maps in this book, where the whole world has to be represented on less than one page. Such detailed maps are said to be drawn on a large scale, while maps like those of the world which are used in this book are drawn on a smaller scale.

Scale is usually expressed by lines drawn to show how many miles on the earth a given length represents. (See Fig. 173.) Scale may also be expressed by a fraction, the numerator of which shows how many inches on the map are used to represent the number of inches on the earth indicated by the denominator. For instance, if we desire to express the scale of a map drawn on the scale of an inch to a mile, it may be done in several ways. A line one inch long and labeled one mile would give a measure which could easily be used in finding any distances on the map desired. The fraction $\frac{1}{63,360}$ would mean the same thing; that is, that one inch on the map represents a mile, or 63,360 inches, on the earth's surface. We can see from

this how necessary it is to make use of the scale in studying a map.

On all maps of large areas the meridians of longitude and the parallels of latitude are shown as continuous black lines. These lines are numbered to show the position of the area they enclose in relation to the earth as a whole.

In this book the scale is shown by a line which represents a certain number of miles. This scale is placed with the title of the map and other information, which together form the *legend*. In comparing areas on different maps the scale on which the maps are drawn must always be taken into account. Continents should be compared on a world map; the countries of a continent on a large-scale map of that continent; and the states and provinces of a country on a large-scale map showing the entire area of that country. It is only by knowing the scale on which any two maps are drawn that we can accurately compare all or parts of their areas.

Map Projections. In large-scale maps the meridians run up and down the map, and the parallels across the map. Owing, however, to the fact that the earth's surface is curved and the map sheet flat, it is very hard to show large areas in their true proportions on a map, as can readily be seen by any one who tries to flatten out a large piece of orange peeling without breaking it. Therefore world and continent maps are drawn according to some definite plan which will tell the truth as closely as possible. These plans are called *projections*.

In those maps in which the meridians and parallels are at right angles to each other the earth's surface is represented as though it were an unrolled cylinder, rather than an opened-out globe. In such maps the regions near the poles are expanded to cover more space on the map than the same amount of globe surface nearer the equator. Such maps are very convenient for showing directions, though they may give us wrong impressions of areas and distances.

In every small map of a large area some form of projection is used, and it is necessary to know the projection as well as the scale of the map in order to understand it. For our purposes it is only necessary to remember that the meridians show the north-south lines, and the parallels the east-west lines. By the study of these lines we can tell the direction of one point from another, and by studying the scale we can estimate distances between them.

FIG. 23. *The Northern Hemisphere, which contains the greater part of the land of the world.*

Questions and Exercises

(1) What gives us our day? Our year? In which direction does the sun apparently move across the sky? The moon? The stars?

(2) Draw a two-inch circle to represent the earth's surface. Locate the poles. Draw the twilight circle and shade the part of the world in shadow as it would be on the twenty-first of March. On what other day would this circle have the same position? (3) Draw a diagram or picture to represent yourself standing at the equator on the twenty-second of September. Show where the sun would be at noon. Draw a companion picture to show where the sun would be at noon on the same day at your home. (4) In which direction would your

shadow point at noon at Buenos Aires on the twenty-second of September? Would your shadow be longer on that day at Buenos Aires or at Para?

(5) Counting thirty days to a month, calculate the number of hours of sunlight the north pole might receive in a year. Do the same at a place on the equator and compare results. (6) Draw a circle to represent the earth's outline. Show the Tropical Zone of Sunlight. Below the drawing write a statement telling why it is so called. Do the same for the Temperate Zones of Sunlight. State the special feature of these zones. (7) Trace the path of the sun in your sky to-day. At what time does the sun rise? At what time does it set? How long is your period of daylight? As the season progresses will the sun move nearer or farther from the zenith at noon? Will the number of hours of sunlight increase or decrease?

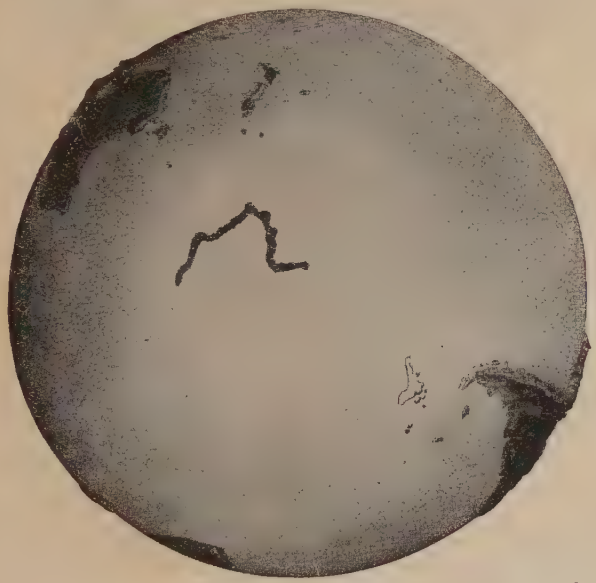

FIG. 24. *The Southern Hemisphere, which is largely composed of water.*

(8) Find the latitude of Natal; Cairo; St. Paul; the large city nearest your home. (9) Explain why the people of Natal never see the Pole-star. Find a town in Africa where the Pole-star is visible on the horizon; find one in South America. What is the latitude of these towns? (10) What is the scale of the map of North America in this book? How many inches represent one mile? Find a map on a larger scale. How many square miles are represented by one square inch on the first map? On the second? (11) On the map of North America find the direction of St. Louis from New Orleans; of Salt Lake City from New York; of Savannah from Detroit.

V. THE CONTINENTS AND OCEANS

Distribution of Land and Water. As we look at the globe, which is our best representation of the larger features of the world, we see that the surface of the earth is made up of land and water. About seven-tenths of the surface is water and the remaining three-tenths land. (See Fig. 28.) Deep under the water, however, there is solid rock forming a part of the solid earth. It is in the greater depressions of the rock mass that we have oceans.

We are more interested in the land surface than in the water surface of the earth, for it is on the land that we make our homes. This visible part of the solid earth we know as the *land*. The larger part of the land area of the world is in the Northern Hemisphere. It is possible to hold the globe so that the visible half contains nearly all the land and the other half nearly all the water. (See Figs. 23 and 24.) Thus we may divide the world into the *Land Hemisphere* and the *Water Hemisphere*. (See Figs. 25 and 26.) The center of the land half, or the *Land Pole*, is near London, England, and the *Water Pole* is exactly opposite, near New Zealand. Thus England is in the center of the great inhabited land area of the world, and New Zealand lies in the vast uninhabited water region.

Continents and Islands. The land of the world is mostly in a few great masses known as *continents*, though some of it is scattered over the world in smaller masses known as *islands*. (See Figs. 25 and 26.) In many places the land of the continents extends off shore for several miles to an edge where the depth of the ocean increases suddenly. These great shallow areas are known as *continental shelves*, because they are really parts of the adjoining continents. (See Fig. 173.) Islands rising above a continental shelf, like the island of Great Britain, are known as *continental*

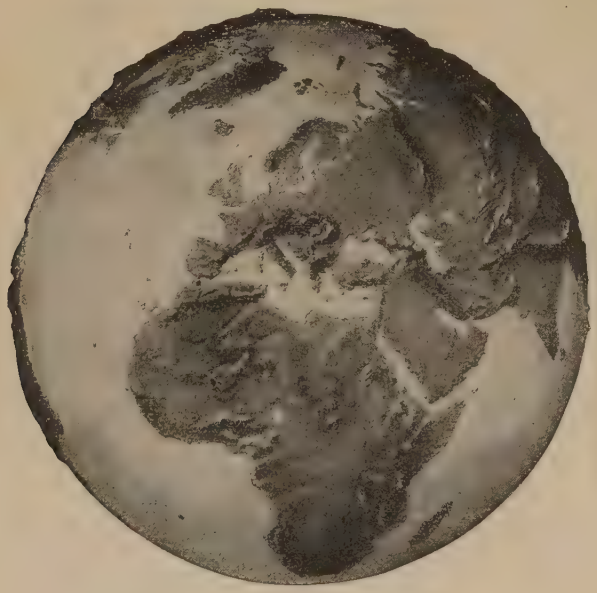

FIG. 25. *The Land Hemisphere.*

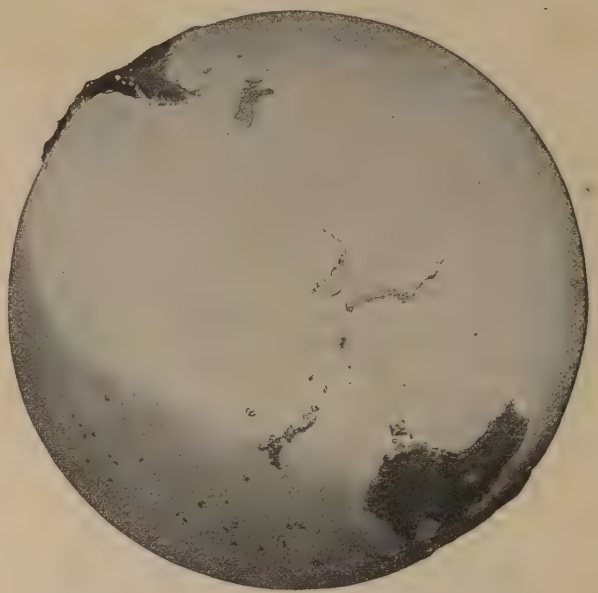

FIG. 26. *The Water Hemisphere.*

islands to contrast them with the *oceanic* islands which rise above the ocean water far from any land, and with the islands lying close to the coast, but separated from it by extremely deep water. The Pacific Ocean is thickly set with small oceanic islands, and Madagascar is a good instance of an oceanic island close to a great continent.

Surface of the Continents. An area of land is not called a continent, however, merely because of its size, but also because of the arrangement of its surface features. All the greater land masses are made up of highlands and lowlands, and the highest highland in each case is nearest to the greatest ocean. The land, therefore, slopes gradually downward from the highest highland toward the smaller oceans. In many cases there is a smaller highland which interrupts the lowland, as in North America where we have the great Cordilleran Highland on the west, and the smaller Appalachian Highland rising slightly above the great lowland of the eastern part of the continent.

According to this description we have five continents — North America, South America, Eurasia (Europe and Asia), Africa, and Australia. (See Figs. 7 and 8.) Eurasia is, for convenience, often called two continents, but it is really one great land area. A few years ago Australia was called an island by some geographers, and a continent by others. As it fits the description given above, however, it is now called a continent by everybody.

The Ocean. Surrounding the land masses of the world is the great body of salt water, the *Ocean*, of which we have already spoken. While the surface of this water area is continuous, and vessels can go from one seaport to another, the continents so divide the mass

FIG. 27

Comparative area of continents and oceans.

Approximate scale 1 cm = 4.8 Square Miles.

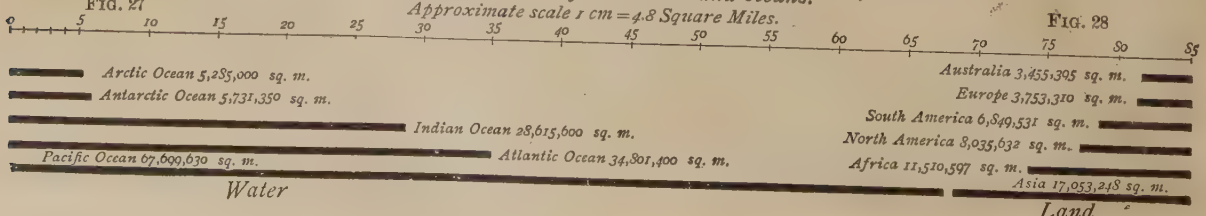

FIG. 28

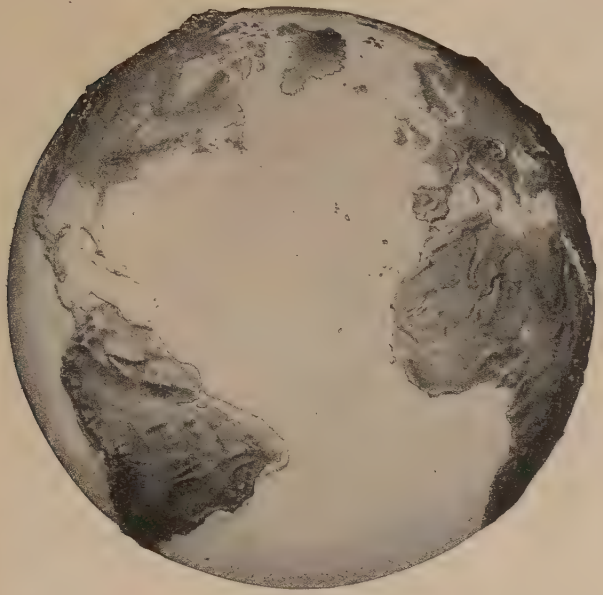

FIG. 29. *The Atlantic Ocean.*

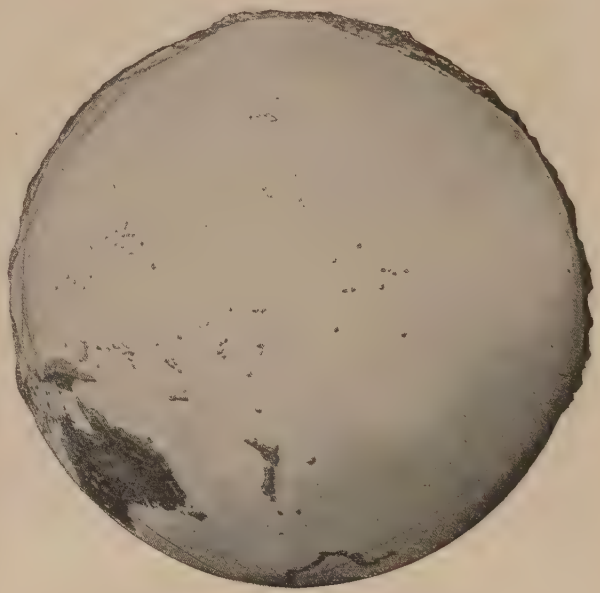

FIG. 30. *The Pacific Ocean.*

into more or less separate basins that, for convenience, these basins are called different oceans. (See Fig. 98.) The great oceans are the Pacific, the Atlantic, the Indian, the Arctic, and the Antarctic. Certain arms of these oceans are so surrounded by land that they are known as *Seas*, like the Red Sea or the Mediterranean Sea. (See Figs. 29, 30, and 31.)

Ocean Eddies. The water of the oceans and seas is commonly in motion in a series of *currents*, due in part to the effect of the wind blowing constantly over their surface. The currents of the oceans, however, differ in their direction and character from those in seas. The currents in the seas depend on the amount of water received from inflowing rivers as compared with the amount lost by evaporation. The Mediterranean Sea, for instance, loses more water by evaporation than it receives. Hence a current flows into it from the Atlantic through the Straits of Gibraltar. The conditions are reversed in the Baltic Sea.

In the ocean the surface water is continually in motion in a great circling eddy, which follows a very definite path. In both the Northern and Southern Hemispheres the currents move from east to west in low latitudes and from west to east in higher latitudes. (See Fig. 98.) Thus the eddy moves in the direction of the hands of a watch in the Northern Hemisphere and in the opposite direction in the Southern Hemisphere.

FIG. 31. *The Indian Ocean.*

In order to be accurate, therefore, we must divide the Atlantic, the Pacific, and the Indian oceans each into two oceans, according to whether they are in the Northern or Southern

hemisphere, because each has a separate eddy in each hemisphere. The Antarctic Ocean moves regularly in a great eddy about the south pole and so is an ocean; but the Arctic Ocean, so called, is not an ocean, as it does not fit the pattern. It is merely a sea which has been called an ocean for so long that we must use the same name, though we know it is not correct. We shall find out more about the movements of water in the seven oceans when we study ocean currents.

Let us now study more about the land on which we have our homes and from whose soil we get our food, our materials for clothing, and our wood or bricks or stone from which we build our houses.

FIG. 32. *A flat plain in South Dakota, where the slope is very gentle.*

Questions and Exercises

(1) Name two *continental* islands off the west coast of Europe; two off the north coast; two off the east coast of Asia; three off the east coast of North America. (2) Name two *oceanic* islands in the Atlantic; three in the Pacific; two in the Indian Ocean. (3) To which class do the following islands belong: Tasmania; Cyprus; the Bermudas; Trinidad; Iceland? (4) Toward which ocean does the great lowland of each continent slope? (5) Name the five continents in the order of their size. (6) What continents lie in the land hemisphere? What continent is in the water hemisphere? What effect should its position have on its commerce? (7) Fill out the following chart by consulting a map of the world and the maps of the various continents:

OCEAN	*Arms*	*Continents entered*
Atlantic ...		
Pacific.....		
Indian.....		
Arctic		

VI. RIVERS AND RIVER VALLEYS

The Landscape. The landscape which we see about us is made up of slopes, over which we travel, and down which the water runs after a rain, seeking lower ground. These slopes are parts of river valleys. In some places we find the slopes are steep and long. We then describe the country as being hilly or mountainous. In others the slopes are very gentle, and we say the land is flat and like a plain. (See Fig. 32.) No two regions are exactly alike, however, for the slopes to be seen in one landscape are not like those in another. It is the variety of landscape that gives beauty to a region and makes traveling pleasant.

Wherever we go we find slopes and valleys, and in most valleys we may see flowing rivers along which people live and build their towns and cities. Rivers help to change the slopes of valleys; they are of service in turning mill wheels, in supplying water to the soil, and to reservoirs of cities, and as waterways for commerce. Rivers and river valleys should therefore be studied with care.

The Formation of Rivers. If we go where two slopes meet at their lower edges, in time of rain we shall find a stream of water, just as water flows down the line where the sloping roofs of two houses join. Such a stream we ordinarily call a *brook*, a *creek*, or a *rill* if it is small, and a *river* if it is large. In some cases the water is clear and beautiful; in others it is muddy and brown. The muddy color is due to particles of *detritus* which the water is carrying away from land. If the detritus is large, we call the pieces *boulders;* small stones we call *gravel;* small, sharp, hard fragments are known as *sand*, while fine, soft, light, black, brown, or gray

particles which float in the water are called *mud* or *clay*.

The clear stream also carries detritus away from the land, even though none may be visible rolling along the bed. Some of the clearest streams in the world contain a great quantity of earth material dissolved in the water. This material is common salt and many other easily dissolved substances which are secured from the rocks. These *salts*, as they are called, are carried out to the ocean and give it its saltness. Where the slopes are steep, as they are in many mountainous regions, the pieces of rock carried along may be so large and heavy that they bang together, making a crackling sound, which can be heard above the noise of the fast-flowing water. (See Fig. 33.)

FIG. 34. *The Platte River in Nebraska during a dry period. There is more detritus than water showing.*

What a River Is. Every stream of water carries along detritus as it flows through the land, and the detritus is as much a part of the stream as is the water. Hence we need to think of a river, not as water merely, but as *a stream of water and detritus moving through the land.* The water and the detritus are moving down hill toward the lowest part of the earth's surface, which is the ocean. In dry regions the amount of water moving down the slopes may be very small, and the detritus may be more conspicuous than the water, while in other cases, as we have seen, the detritus is invisible. Thus the proportion between the water and the detritus may vary greatly in different regions. (See Fig. 34.)

FIG. 33. *A river in Switzerland, showing boulders carried in time of flood.*

River Basins and Systems; Divides. All the land whose surface water and detritus are moving toward the ocean down one great river we call the *basin* of that river. All the streams which combine to make one great *main* or *master* stream we call a *river system.* (See Fig. 36.) Each of the smaller streams which *contributes* water and detritus to the master stream is a *tributary.* (See Fig. 36.) As there is no region which does not have slopes, river basins are found everywhere over the earth.

As we climb the slope from a stream toward its head, we finally reach a point from which the land slopes in at least two directions. If we try to go from one river basin to another along any line, we always pass over a point from which the water could flow in either direction. The line marking off one basin from another is known

as a *divide*. During a rainstorm it divides the water going down one slope from that going down the neighboring slope, as the ridgepole of a house does. (See Fig. 35.)

The Work of Rivers; Valleys. As the running water moves through the land it continually changes the form of the land by removing materials from the surface. Thus a river is doing work, for it is gathering up rock detritus and carrying it away. A river works more rapidly where it flows quickly and more slowly where it flows gently. Therefore, streams wear the land away most rapidly near their heads. Here they cut sharply into the rocks much as a saw cuts a gash in a log, and form narrow, steep-sided gorges, which are one kind of *valley*. If the stream and the weather keep on wearing away the rocks, the valley will be cut deeper and broader, and more of the land will be removed, until finally all the land may be worn down as low as it can be, and still permit the streams to run down the faint slopes.

FIG. 35. *Divides in a mountainous country. The highest ridges form the main divide, the lower slopes the lesser divides.*

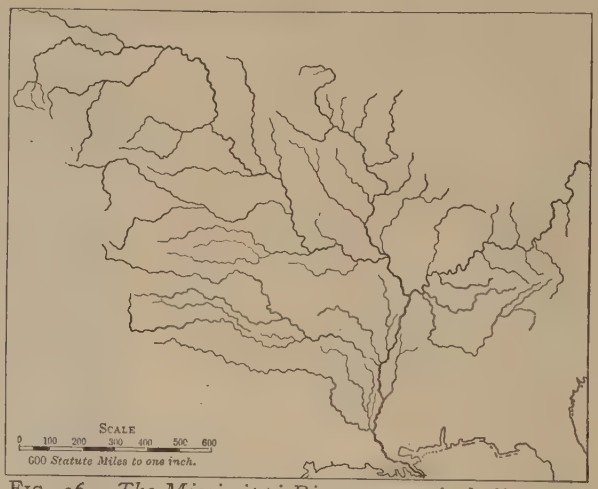

FIG. 36. *The Mississippi River system, including large branches, many smaller branches, and a large extent of land surface drained.*

Young River Valleys; Canyons; Water Gaps. A river which has just begun its work we call a *young* river, because it has worn away but little of the land through which it runs. (See Fig. 37.) It has done but a small part of the work waiting to be done during its long life. A *young valley*, therefore, is a valley that has been but little worn, and is narrow in proportion to its depth. Such young valleys are usually found near the headwaters of rivers, but may be found wherever a rock wears away very slowly, so that here the river valley remains narrow, while perhaps upstream it is broad and flat.

A young valley, if it is small, is often called a *gorge*, *glen*, *ravine*, or *chasm*, and if very deep a *canyon*. The greatest young valley in the world is the Grand Canyon of the Colorado in Arizona. In places it is more than a mile deep and about thirteen miles wide in its widest portion. (See Fig. 38.) Narrow young valleys are often hard to cross, because one scrambles down one side and up the other with great difficulty. (See Frontispiece.) People do not as a rule, therefore, live in young valleys, because there are no gentle slopes on which they can raise crops or build their houses.

Sometimes a broad valley contracts for a

short distance to a narrow gorge, because of a barrier of rock or a mountain ridge. This stretch of narrow valley becomes important because all railroads, highways, and canals in the valley must pass this one point. At such points there is often a town. These short, young valleys are sometimes known as *water gaps* (see Fig. 39), like that cut by the Delaware in New Jersey and Pennsylvania, or the gap of the Potomac at Harpers Ferry.

FIG. 37. *Ausable Chasm, near Keeseville, New York. A young valley in which the stream is cutting rapidly.*

Waterfalls and Lakes. When a river is young, its course in the mountains and hills is often irregular. In places it bounds along in *rapids*, or it may leap over cliffs or down very steep slopes, forming a *waterfall*. (See Fig. 41.) A great waterfall like that of Niagara is often known as a *cataract*. A fall made by a small stream leaping a great distance is commonly called a *cascade*. Many of the cascades in the White Mountains of New Hampshire are famed for their beauty the country over.

In some places the water finds a barrier in its course, behind which it must accumulate before it can flow over the edge. Then it forms a quiet stretch of water known as a *lake* or *pond*. (See Fig. 42.) Water may flow into the lake by several streams known as *inlets*, but as a rule it flows out at only one place, the *outlet*. In some regions lakes also occur in basins in the ground and have no outlet. If such a basin should fill up, the water would flow over the lowest point in the bounding rim and a stream would be formed.

The Uses of Lakes and Waterfalls. Lakes and waterfalls are often helpful to us. Waterfalls are sometimes so beautiful or grand that people travel great distances to see them. The force of the falling water is frequently used to turn wheels, to give power to mills, and to operate dynamos and other machines. A portion of the power of Niagara is now used to develop electricity for heating and lighting in the city of Buffalo, twenty miles away.

Lakes also may be noted for their beauty, and their leeward sides are frequently chosen as sites for summer homes and camps. Large lakes or long narrow lakes are much used as lines of travel and commerce, because water transportation is usually cheaper than land transportation.

The greater part of the traveling and exploration in very early days was by way of lakes and rivers. The Great Lakes and Lake Champlain especially were used by the early missionaries and explorers. The American

Indians of the eastern states were famous for their skill in managing a canoe, and on many of the rivers and lakes of the northern states Indians still get their living largely by acting as guides for travelers and sportsmen.

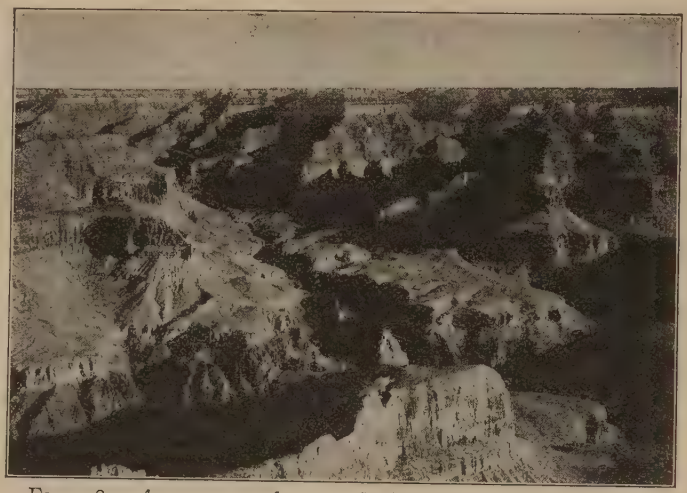

FIG. 38. *A canyon. A general view of the Grand Canyon of the Colorado.*

Lakes are useful in another way. They act as filters for the streams that flow into and out of them. The detritus brought into the lakes settles to the bottom, and the water flows from the lakes clear and beautiful. This is well illustrated by the St. Lawrence River, which is very clear where it flows out of Lake Ontario. The fine detritus deposited on the bottom of a lake and the accumulated vegetation gradually fill it up, until, in the course of time, it is changed into a marshy spot covered with trees and plants and known as a *swamp*, or even into firm land suitable for farming. (See Fig. 42.) There are thousands of such places in our northeastern states which were formerly small lakes.

Whenever a large lake has dried up or been drained, as sometimes happens, the bottom or floor forms a flat plain, and usually makes fertile farming land. The great wheat fields and flax fields of Minnesota, North Dakota, and Manitoba are in the basin of a great lake known as Lake Agassiz, which has long since disappeared.

FIG. 39. *Tyrone, Pennsylvania, built on a broad plain at the end of a water gap in the basin of the Juniata River.*

Questions and Exercises

(1) Where have you seen a brook? (2) What sort of detritus was it carrying away? (3) Toward what ocean was it moving? (4) Study the picture of the Swiss river in this chapter. (5) Does it carry much or little detritus? (6) How is it different from the brook you have described? (7) Locate on a map some river you have seen. (8) Of what use is this river to the people who live near it? (9) To what river system does it belong? (10) Trace on the map a divide between this river basin and a neighboring basin; between two tributaries of the same river. (11) Have you ever stood on a divide? (12) Where was it? (13) Trace the divide between the Mackenzie and the Yukon; the Arkansas and the Red rivers. (14) Write in one column the chief river systems of North America; in another those of Africa; in another those of Asia. (15) Study the pictures of young valleys in this chapter. (16) Draw a cross-section of Ausable Chasm. (17) Is the valley wider at the top or at the bottom? (18) Can you tell why? (19) What is the difference between a gorge and a chasm? (20) Why do railroads follow river valleys in crossing a mountain range? (21) Explain why

Tyrone grew up at that point. (Fig. 39.) (22) Locate on your map the Delaware Water Gap. (23) Why must a railroad or highway pass through this gap? (24) Give one reason why a town is likely to grow up at such a water gap.

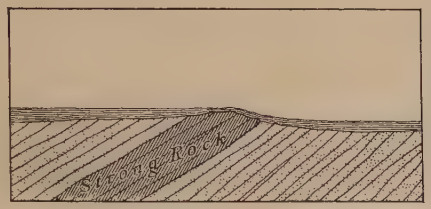

FIG. 40. *Diagram of a rapids where the water of a lake flows out over strong rock.*

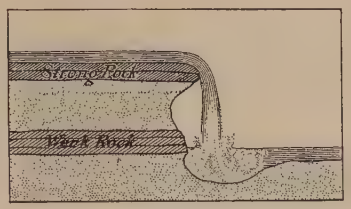

FIG. 41. *Diagram of a waterfall.*

(25) Draw Lake Winnipeg with its inlet and outlet. (26) On the same sheet of paper draw a map of a lake you have seen, with its inlet and outlet. (27) Which part of a lake, the head or the foot, generally begins to fill up first? (28) Name four lakes in Canada. (29) Study the picture in this chapter that shows a filled-in portion of a lake. (Fig. 42.) Why should this lake bottom or plain make good farming land?

(30) Name six lakes in North America that are used for transportation; two in Europe. (31) Name and locate three lakes in Northern New England. (32) Name four lakes which lay in the routes of early explorers of our country.

FIG. 42. *A New England lake gradually filling up with detritus and decaying vegetation.*

VII. RIVERS AND RIVER VALLEYS (Continued)

Mature River Valleys. As young valleys grow old and are worn into more and more gentle slopes, the valleys become valuable for occupation if located where people can live. A broad, middle-aged, or *mature* valley, like the Shenandoah Valley, is often devoted to farming, and has railroads and highways. Mature valleys are often thickly populated, because many people can secure a living on their pleasant slopes and rolling surfaces. (See Fig. 43.)

FIG. 43. *A farm scene in a mature valley.*

A mature valley generally has but few lakes, because the stream by this time has succeeded in wearing down the barriers in its course, so that it can flow freely. There may be occasional waterfalls, however, where some unusually strong barrier exists.

Sinks. In those regions where the underlying rock is limestone, the water frequently dissolves away the rock, forming small basin-like bowls. The water flows from all sides toward these holes in the ground, and sinks out of sight. Such basins are commonly known as *sinks*. The water from these sinks runs along underground and sometimes reappears miles away as a large spring. Such rivers are sometimes known as *lost rivers*. If the outlet to a sink becomes closed, the water accumulates, forming a lake. There are many such sink regions and lost rivers in eastern Tennessee and northern Alabama.

Deposits in Mature Valleys; Alluvial and Flood Plains. The slopes in a mature valley are more gentle than those in a young valley, and along the main stream they often take the form of a

FIG. 44. *The old peneplain of New England, as it appears in New Hampshire.*

flat plain. Such plains are known as *alluvial plains*. They have been built up out of the detritus that the stream, owing to its lack of force, could not carry farther. (See Fig. 46.) If alluvial plains are flooded at times of high water, as often occurs, they are called *flood plains*. (See Fig. 45.) These plains, because of their fine soil, level surface, and nearness to water, are frequently good farming regions. If narrow and bordered by steep slopes, they furnish perhaps the only route that carriage roads and railroads can follow.

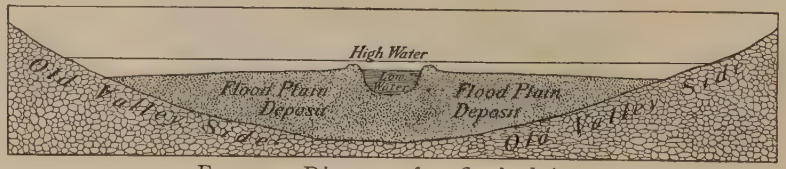

FIG. 45. *Diagram of a flood plain.*

The alluvial plain of the lower Mississippi is one of the largest and most important river-made plains in the world. (See Fig. 47.) Almost any small stream, however, will have small patches of alluvial plain along its course.

Alluvial Fans. When a tributary stream flows from the steep side of a valley on to the gently sloping floor of the main valley, its force is suddenly weakened, and it deposits a large amount of the detritus it is carrying. This detritus is usually built up in the form of a *cone*, pointing into the mouth of the tributary, and extending out in an even slope into the main valley. These cones are shaped somewhat like an open fan, and are therefore frequently called *alluvial fans*. Oftentimes the tributary divides and flows down over the face of the cone in several channels, called *distributaries*, because they scatter the water and detritus in many directions.

Alluvial fans are particularly abundant in the dry regions of the world where the rivers have little volume and force. They may often be seen after a rain beside a gutter stream which has received side streams carrying much detritus.

Old Valleys. As the rivers go on wearing away the land, they gradually reduce the slopes until the region becomes very flat, with just enough incline to make the rivers run. Then a river and valley may well be called *old*, for most of the land to be worn away has already been removed. Alluvial plains abound in the lower portions of old rivers, because the force of an old river is not great enough to carry away the large amount of detritus brought down by the tributaries. The lower Ganges-Brahmaputra and the lower Mississippi are both old rivers. If the streams in a large part of a country should all become old at the same time, the whole

FIG. 46. *The Charles River near Cambridge, Mass. An alluvial plain built up from the detritus of the winding river in the distance.*

region would be worn down almost to a plain lying but little above the level of the sea.

Peneplains. At several times in the distant past the streams of the eastern part of our country have worn their valleys to such a plain-like form. We do not find many evidences of this condition, however, in the present rivers of the world. Such an old region, worn down *almost to a plain*, is known as a *peneplain*.

Peneplains occur in many parts of the world now, but they have been elevated since they were formed, and new valleys have been cut in them, so that we can see the peneplain only by climbing to the tops of the ridges. Then we find that all the ridges lie at approximately the same height, showing the former extent of the peneplain. The upland of New England above which the higher peaks rise only a few hundred feet is one of the best known peneplains in the world. (See Fig. 44.)

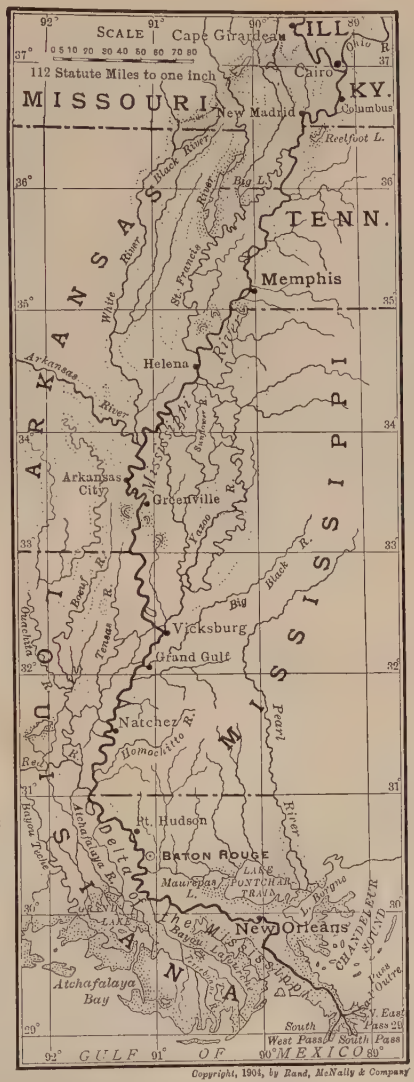

FIG. 47. *A map of the alluvial plain of the Mississippi.*

Monadnocks. If any one has seen a wooden floor worn almost through, he can easily imagine how elevations are formed on the land by the wearing away of the rocks. In such an old floor little elevations will often be left where there was a knot in the boards, or perhaps a nail. In the same way any particularly strong point in a region will persist when the neighboring country has been worn down to a peneplain. Such elevations are known as *monadnocks*, because they rise above the old peneplain surface, as Monadnock Mountain in New Hampshire rises above the old peneplain which may now be seen on the neighboring hilltops.

Meanders. A very old river usually has a large alluvial plain, a part of which may be a flood plain. As the slope of the river is gentle, and the water consequently flows slowly, it can carry only the finest detritus. Thus the particles forming an alluvial or flood plain in an old valley are extremely fine, and the soil is excellent. When a river flows so slowly and quietly, it cannot follow a straight course, as most young rivers do, but is turned from its path by the slightest obstacle; hence it follows a winding, snake-like, or meandering course. (See Fig. 48.) The curves are called *meanders*, because they are like those of the Menderez (ancient Meander) River, which flows through Asia Minor.

In a meandering stream the water is deeper and swifter on the outside of the curves than it is on the inside. The river often cuts into its shore on the outside, forming a steep bank,

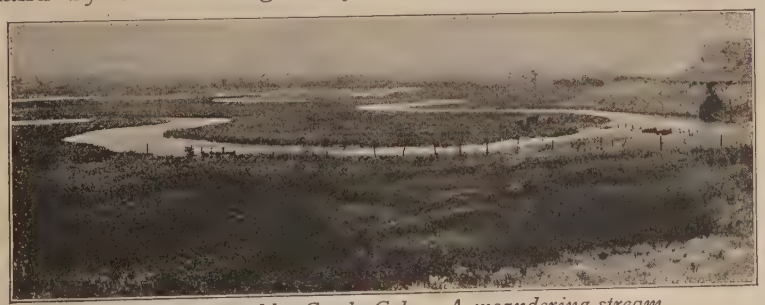

FIG. 48. *Boulder Creek, Colo. A meandering stream.*

while the inside shore slopes gently. Sometimes the meanders become so close together that finally the land separating them is cut through, thereby straightening the river. The meanders are then left as lakes in the shape of horseshoes, with the open side of the horseshoe facing the river. Such lakes are made by the river as it develops, and are very numerous in large, old rivers like the Mississippi. They are sometimes known as *oxbow* lakes, and the new stretch of river cutting across the neck of a meander is commonly called a *cut-off*. (See Fig. 49.) A cut-off often shortens the course of a river by many miles. Oxbows only make navigation the more difficult, and cut-offs are of little value, as they are usually made in streams that have a continually shifting channel.

FIG. 49. *A portion of the Mississippi River, showing meanders and an oxbow lake.*

Population in Old Valleys. Old river valleys, in countries where the climate is favorable, are, as a rule, occupied by farms, and often support a dense population. The most densely inhabited regions in the world are the old river valleys of southeastern Asia.

FIG. 50. *The lower delta of the Mississippi River.*

These regions, like the old valley of the Nile in Africa, or the Ganges-Brahmaputra in India, are famous because they have supported dense populations for a long period of time.

Deltas. Where a river flows into the ocean, or any body of standing water, such as a lake, or even into a quiet stretch of a larger river, most of the detritus is dropped near the mouth of the stream, thus building the land gradually into the water, and forming a *delta*, so named because of its resemblance to the Greek letter Δ. (See Fig. 50.) The deltas made from the detritus brought by old rivers are flat, and made of very fine materials. Those made by a young river are often steeper in their slope, and made up of coarser material, like sand and gravel.

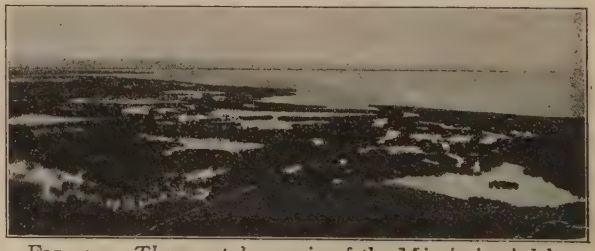

FIG. 51. *The coastal margin of the Mississippi delta, showing how the land is built into the water.*

The main stream frequently divides at the head of the delta and flows across it in several distributaries, as in the case of alluvial fans. The deltas of the Nile, the Ganges-Brahmaputra, and the Mississippi are very large, and have many distributaries. (See Fig. 51.)

Drowned Valleys. The land is slowly rising or settling in many parts of the world, and rivers flowing across such a rising or settling region are changed in many ways. It is not

easy to study the changes produced by an elevation of the land. We can easily see the effects of settling, because as the land slowly sinks, the ocean water gradually fills up the river basins, so that the portions of the valleys which were formerly above water are submerged and no longer visible. We say that such valleys have been *drowned*. (See Figs. 52, 53, and 54.)

FIG. 52. *An estuary in New Brunswick formed by the drowning of a small mature valley.*

If an old or mature valley is drowned, we have a broad arm of the sea, irregular in outline, into which flow many separate streams, formerly tributaries of the drowned master stream. Such drowned valleys are known as *estuaries*, and are very helpful in commerce because they usually form good harbors. (See Fig. 54.) The estuaries of Chesapeake Bay and the Hudson River and of San Francisco Bay are good illustrations of drowned valleys which are commercially of great importance.

If the river valley is narrow and young when it is drowned, we have a steep-walled, narrow valley known as a *fiord*. (See Fig. 55.) Fiords are often very beautiful, because of the rugged scenery about them, but they are not important in commerce because few people can live along the sides of such drowned valleys. The fiord of the Saguenay River, in Quebec, is one of the most beautiful in America, though there are many well-known and splendid ones along the coast of British Columbia and Alaska. The coasts of Norway, of southern New Zealand, and southern Chile are also indented by magnificent fiords.

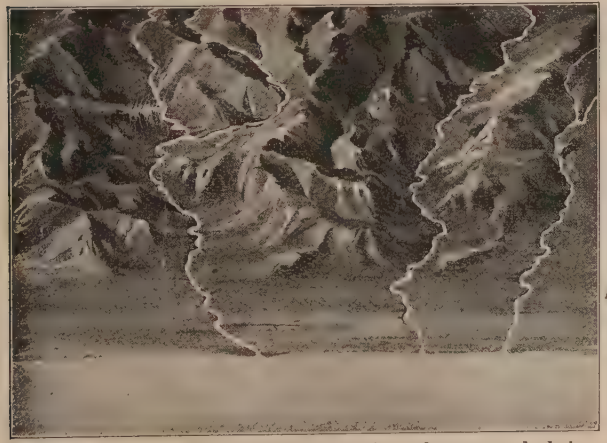

FIG. 53. *Mature river valley, bordering a low coastal plain.*

FIG. 54. *The plain and the valleys seen in Fig. 53 after being drowned.*

Hills and Valleys. As the rivers wear down the land about them, forming valleys, the stronger rocks, which are worn away more slowly, are left rising above the gentle slopes, often in isolated elevations known as *hills*. A hill, therefore, is a small part of the land that has not yet been worn down as low as the rest of the region. We shall see later that, as the land wears away, very high elevations, or *mountains*, are sometimes left between river valleys.

Questions and Exercises

(1) Examine the picture of a mature valley in this chapter. What can you say of its slopes, of its fitness for farming, for supporting a large population? (2) What is the character of the detritus carried by a mature river? (3) Why cannot such a river transport large boulders? (4) Tell how a river builds up its flood plain. (5) Why should such plains generally be good farming land? What dangers may threaten people living on such plains? (6) Locate the Mississippi flood plain; the Rhine flood plain; name two cities on each. (7) Which streams bring most detritus to the Mississippi, those from the east or those from the west? Why? (8) Find portions of the Mississippi that meander. (9) Do you find meanders near the sources of rivers? Give the reason. (10) How many cut-offs do you find in Fig. 49? (11) What hindrances to navigation does such a river present? (12) Find out something interesting about the Mississippi flood plain; its cut-offs; its oxbow lakes. (13) How far up the Mississippi can ocean steamers go? What city is located there?

(14) Make a list of the chief cities on the Nile, the Ganges, the Yangtse-kiang, and the Mississippi, and place opposite each its population. Write below this exercise your reasons why these river valleys should support such a dense population.

(15) Name and locate five important deltas of Asia and name a city in each. What is the chief delta city of the Volga? Of the Rhine? Of the Rhone? (16) Name and locate five estuaries in North America which admit large vessels.

FIG. 55. *A Norwegian fiord formed by the drowning of a young valley.*

VIII. PLAINS, PLATEAUS, AND MOUNTAINS

What Plains and Plateaus Are. A great part of the surface of the world is composed of plains or plateaus, on which a large proportion of the people of the world live. On a plain there are generally few elevations rising above the prevailing level of the country, the slopes are gentle, and, if the plain is not wooded, extensive views can be obtained in almost any direction.

A plain may be hundreds of miles in extent or it may contain only a few acres. (See Fig. 56.) In every case it either slopes gradually down to lower land or water, or it is bordered by the somewhat steeper slopes of hills or mountains as are some of the western plains of the United States.

A plateau is characterized by slopes similar to those of a plain, but it often has a greater number of elevations rising above the general surface of the country. A plateau usually drops *abruptly* on one or more sides to lower land. The Cumberland Plateau in the southern Appalachian Mountains descends to the lower land to the east in a bold *cliff* or *escarpment*, in some places more than a thousand feet high.

FIG. 56. *A broad plain in Kansas.*

Owing to the evenness of the surface of a plain or plateau, it is often impossible to tell from the top of the region whether it contains any river valleys, so sharply are these sunk beneath the plain. Owing to the great altitude of a high plateau the rivers have a chance to cut deep valleys before they reach low levels. These river valleys often have nearly vertical sides, and by examining them we learn that the layers of rock in a plain and plateau are usually almost horizontal. The deepest and most wonderful river valley in the world is the Colorado Canyon, already mentioned, which has been cut into the Colorado Plateau in Arizona. (See Figs. 38 and 57.)

FIG. 57. *The plateau of the Colorado Canyon.*

Low plains, in regions where the climate is favorable, are very productive and are densely inhabited. But many plateaus are so high that their climate will not permit of farming. These are often occupied, however, by people who are engaged in grazing. On both plains and plateaus the slopes are so gentle that if there are no deep river valleys to be crossed, roads and railroads can be built with equal ease in almost any direction. For this reason, in a newly discovered country, people rapidly occupy the plains, where they can spread out and have plenty of room, as was illustrated in the occupation of the Great Central Plain of the United States.

Mountains. Every continent contains a certain area that rises into a great highland known as a *mountain system*. A mountain system is usually made up of several nearly parallel series of heights known as *mountain ranges*, each of which usually has many points, or *peaks*, rising somewhat sharply above the rest of the ridge. (See Fig. 58.)

Any height rising sharply to a considerable altitude above the surrounding region is commonly known as a mountain. The term mountain, however, is more properly applied to any region in which the rocks have been folded or turned on edge. (See Fig. 59.) During the folding and wrinkling of the earth the rocks may have been greatly heated so that they have lost their original appearance. Every boy knows how a piece of iron can be made warm by pounding, and can therefore understand how the rocks of a mountain may be heated by being pressed together.

FIG. 58. *A mountain range in the Pyrenees, showing peaks rising in the distance.*

We know very little about the reasons for mountain building, but we know that

FIG. 59. *Rocks, on the southwest coast of England, showing how pressure forms mountain folds.*

mountain ranges are continually rising, just as we know that the continents are continually rising or settling. As a mountain range rises, it begins to be worn down, as are all land forms, and in this way furnishes detritus for the rivers to carry away. Thus the mountain peaks we see are but a part of the mass of rocks formerly existing there.

FIG. 60. *A mountain pass in Norway.*

The Relation of Mountains to Man. Mountains usually contain many steep and long slopes, and are so rugged that they are often hard to travel through. Railroads and highways are built with difficulty across mountain districts. In some cases tunnels many miles in length have to be constructed for railroads to pass from one side of the range to the other. Mountains have always been barriers, hemming people in and keeping them from readily occupying the area beyond.

From the standpoint of commerce or travel, therefore, the important parts of a mountain system are the lowest points in the crests or ranges where people can get over most easily. Such low *gaps* or *passes* have always been of great importance. (See Fig. 60.) In certain parts of our country, roads or trails were made through these natural gateways by the Indians and buffaloes that formerly occupied the region. In many cases, as for instance in West Virginia, these early paths are now used for railways or highways.

The high peaks are usually avoided except by those who wish to ascend them for the pleasure of mountain climbing, or for the view to be gained from them. As the air on mountains is always thinner and purer than that on the lower plains, these highlands are visited by many people in search of health or for pleasure, particularly in the summer time.

The highest peaks in the world have their summits covered with snow. (See Fig. 58.) Most of the other mountains are covered by forests, and are the homes of certain wild animals which can climb over the rocks and the steep slopes with ease. Therefore, mountains are often visited by hunters in search of big game. Some mountains contain valuable minerals

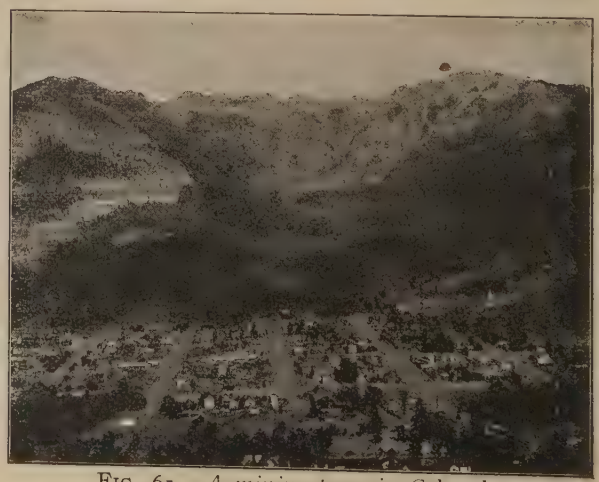

FIG. 61. *A mining town in Colorado.*

like gold, silver, and copper, and hence mining towns have sprung up in regions that never would have been occupied otherwise. (See Fig. 61.) Leadville and Cripple Creek, Colorado, are examples of such mining towns. Farming is impossible in mountain regions, except on the plains found in the occasional valleys lying between the ridges.

Questions and Exercises

(1) Locate the chief plains of North America. (2) Draw a sky line of a plain; of a mountainous region. (3) Why will the region of the Colorado Canyon never be densely populated? (4) Name plains of North America that are thickly populated; of Europe; of Asia. (5) Would you rather live on a plain or in a mountain valley? Why? (6) Name and locate five mountain ranges in Asia; five in Europe; ten in North America. (7) Describe some mountain peak you have seen or know from a picture. (8) Name and locate six peaks in the United States; six in Europe; four in South America. (9) Read about the ascent of some famous peak and describe it to your classmates. (10) Study the picture of a mountain fold in Cornwall; what part of this fold has been worn away?

(11) What mountain ranges in the United States formed a barrier to the early settlers? Name and locate three rivers that cross this mountain wall. (12) Why are the passes over the Alps from Switzerland to Italy important? (13) What states in the United States are bounded in part by mountain ranges? (14) What countries in Europe are most mountainous? (15) Name and locate four mountain groups in North America much visited as pleasure resorts. (16) Name and locate one such group in Europe.

IX. UNDERGROUND WATER

Ground Water and Run-off. Only a certain part of the rain that falls runs down immediately toward the sea in rivers. A good deal of it is dried up or evaporated, and much of it soaks into the ground, becoming what we know as *ground water*. The cracks in the rocks are filled with water to very great depths.

It is this ground water soaking through the soil that feeds the plants and the trees. In all farming regions, therefore, it is important to know how large a part of the rainfall will immediately run off, and how much will soak into the ground. The portion that immediately runs off is known as the *run-off*. Some soils, especially if they are sandy, will take up water much more readily than others. Regions that are covered by forests or grass do not have as great a run-off as those that are barren of vegetation.

FIG. 62. *An irrigated field in Kansas.*

In regions where the run-off is very great the water is sometimes held back in large artificial reservoirs and fed out to the land as needed. This watering of the land, either with the water thus stored up or with water pumped from deep wells beneath the ground, is known as *irrigation*. (See Fig. 62.) Many regions, like parts of southern California and Spain, that would otherwise be deserts, have become fertile garden spots through irrigation.

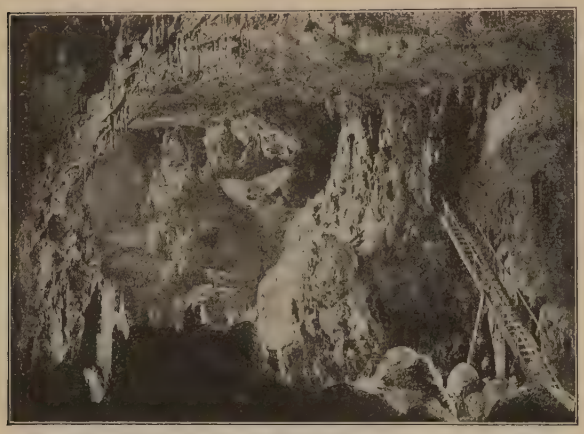

FIG 63. *The interior of a cave in New South Wales.*

Wells and Springs. It is the underground water soaking through the soil that accumulates in a hole dug in the ground and forms a *well*. When the ground water finds its way to the surface again, as it often does, we have a *spring*. Every spring is one of the sources of some river which drains the region in which it is located. Every river has many such sources.

Caves. Limestone rocks are easily dissolved by water, so that in limestone regions much of the water often runs along beneath the surface, dissolving out an underground channel and forming what we call a *cave*. The cave water finally comes to the surface again at a lower level, and flows on as a river. Some of these caves are very large and have miles of underground passages. (See Fig. 63.) The Mammoth Cave of Kentucky is one of the best and largest examples in the world.

FIG. 64. *A hot spring deposit in Yellowstone Park. The minerals in solution in the heated water gradually build these beautiful deposits.*

In the course of time a large part of the roof of a cavern may fall in, leaving perhaps one section in the form of a *natural bridge* crossing from one side of the valley to the other. Natural bridges are formed also in several other ways, but one of the most noted, that of western Virginia, on the headwaters of the James River, has been formed in this way.

Questions and Exercises

(1) What may be two reasons why the region pictured in Fig. 62 has to be irrigated? (2) What soils take up water readily? (3) What is a well? A spring? Describe a spring you have seen. (4) Is there much or little run-off where you live? How does the character of the soil affect this?

(5) What is the character of the soil about your home? (6) Does the rain soak into the soil easily? (7) Are wells common?

(8) Are the slopes in your vicinity covered with trees? How does this affect the run-off? (9) Why should the United States government wish to keep great forest areas from destruction? (10) Name some regions in the United States that have been made fertile through irrigation. (11) Where does the water in the reservoirs in these cases come from?

(12) Why is it necessary to irrigate vineyard slopes in Switzerland where the rainfall is moderately heavy? (13) Why is irrigation necessary in the Po Valley in Italy? In the Nile Valley? (14) How may a *natural bridge* be formed in a limestone region? On a seashore? (15) Describe one you have seen pictured. (16) Locate Mammoth Cave; Luray Cavern; Natural Bridge. Tell how these caves were formed. Have you ever seen a cave that was not formed in the way these caves were? Tell about it. Find out about the animals of Mammoth Cave.

X. VULCANISM

Hot Springs. In some regions of the world the water which has soaked into the ground comes to the surface again very much heated. This is because the interior of the earth is hot, and the water has penetrated far enough to become heated, even to the boiling point. When this water flows quietly to the surface like a spring we call it a *hot spring*. (See Fig. 64.)

Many places in our country are famous for their hot springs. Numerous hot springs exist in the Yellowstone National Park, in Arkansas, Colorado, Virginia, and some other states. Some hot springs bring to the surface water that is full of dissolved minerals, which make the water beneficial for people suffering from certain diseases. Hence, hot springs frequently become health resorts, where people go to drink or to bathe in the waters.

FIG. 65. *Old Faithful Geyser in Yellowstone Park.*

Geysers. In the Yellowstone National Park in Wyoming, in Iceland, and in certain parts of New Zealand, the hot waters spout out of the earth at regular intervals, forming intermittent hot springs, known as *geysers*. From some of these the water is thrown to a height of more than two hundred feet. (See Fig. 65.)

Geysers are beautiful and majestic, and some of them pour forth an enormous amount of water when in eruption. There are so many geysers and hot springs in one part of the Yellowstone National Park that the river carrying away their water is appropriately named Firehole River.

The dissolved minerals brought to the surface through hot springs and geysers often crystallize again as the waters cool. Thus deposits of minerals are built up about the mouth of the geysers or springs, forming a considerable elevation above the region round about. (See Fig. 66.) Some of these hot waters contain a low form of plant life, which gives a most beautiful color to the deposits.

Volcanoes. The waters that penetrate deep into the earth sometimes come to the surface again in the form of steam. The steam may be so hot that it melts the rocks through which it penetrates. Then the steam, hot water, and melted rock either flow gently out upon the surface or are blown into the air with tremendous force and to an

FIG. 66. *A cone built by the mineral deposits of a hot spring in Yellowstone Park.*

enormous height, forming a *volcanic eruption*. (See Fig. 459.)

In most eruptions a large part of the rock material poured forth falls about the opening, building up a conical peak known as a *volcano*. (See Fig. 67.) At the top of the peak there is usually a saucer-like depression, known as the *crater*. At the bottom of the crater is the opening, or *throat*, of the volcano, through which issues the mass of steam, hot water, and rock. The melted rock is called *lava*.

Fig. 67. *The cone of an extinct volcano, New Mexico.*

In some cases the lava, instead of coming to the surface, penetrates cracks in the earth, caused by the explosive force of the eruption, and fills them up. Later, when the overlying weaker rock has been worn away, the hardened lava will be revealed. This is the history of the rocks forming the beautiful Palisades of the Hudson. When the volcanic eruption is intense the melted rock is blown out in fine particles which may be carried vast distances, falling as fine dust known as *volcanic ashes*. Sometimes the rock is only partially melted and is blown forth in large, hot masses known as *bombs* or as great unmelted blocks of stone. (See Fig. 68.)

Fig. 68. *A great block from Mount Pelée, Martinique.*

Perhaps the best known and most symmetrical volcano is Vesuvius. During a great eruption, nearly two thousand years ago, its ashes buried two neighboring cities, Herculaneum and Pompeii, killing great numbers of people. During a severe eruption in 1906 Naples was deeply covered with ashes, which the winds carried across the Adriatic, and lava flowed far down the cone. The last great volcanic eruption was that of Mont Pelée, in the summer of 1902. (See Figs. 68 and 337.) Mont Pelée is on the island of Martinique, in the Caribbean Sea. This eruption caused an enormous amount of damage, and killed more people than any other known volcanic explosion.

Extinct Volcanoes. When a volcano loses its energy and ceases to be active, the lava cools in the throat of the crater and forms a dense mass of solid volcanic rock. The crater, being plugged up, forms a saucer-like basin in which water may accumulate after a rain, forming a lake. In some of the volcanoes of Arizona and New Mexico which have long been extinct there are such volcanic lakes, but the best examples are in central France, where many of them are found. In Oregon there is a famous crater lake, deeply set amid encircling cliffs of great beauty, but this lake is unlike those noted above, because it has not been formed in the same way. In this instance the top of the volcano has disappeared, and the lake lies in the depression thus formed. (See Fig. 181.)

As a volcano is gradually worn down, the ashes and lava forming the cone are worn away more quickly than the lava in the

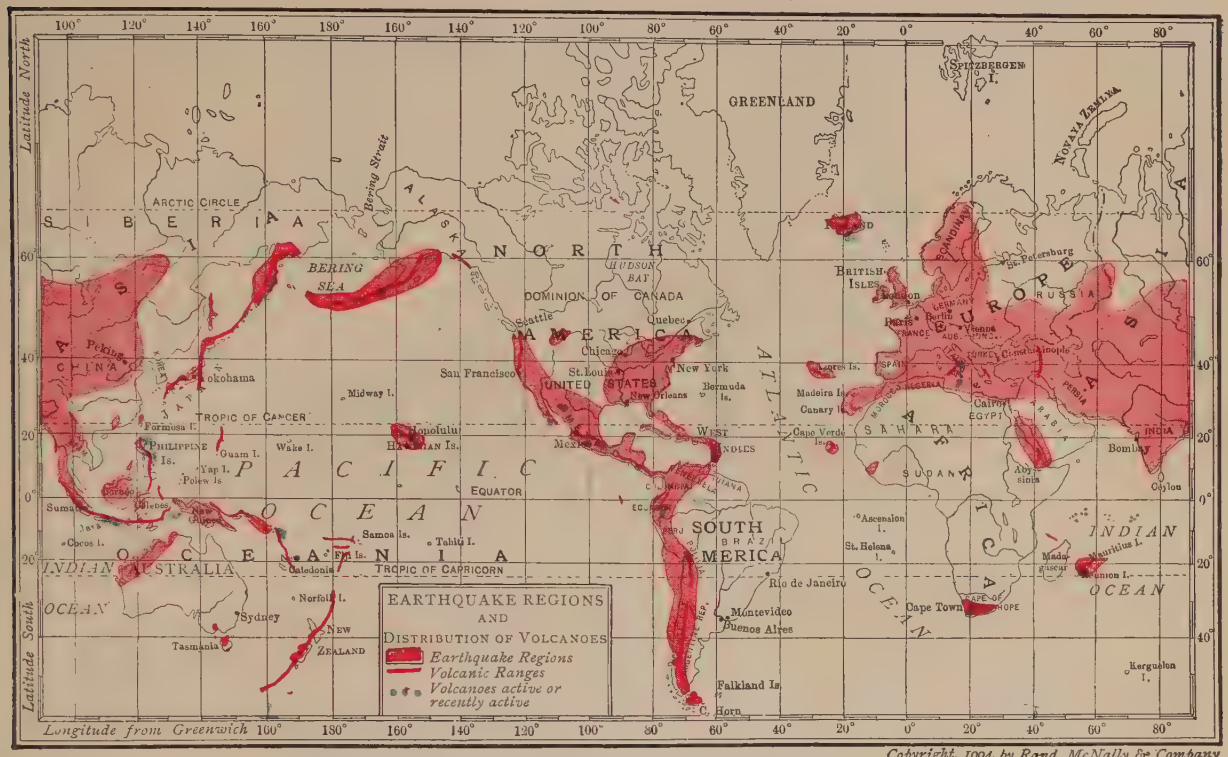

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FIG. 69. *Earthquake regions and distribution of volcanoes.*

throat. Thus the lava plug may be left rising sharply above the rest of the country in the form of a peak. Such volcanoes, called *old* volcanoes because it has been a long time since they were in eruption, have lost their original shape and much of their mass. Old volcanoes exist in many parts of the world, and are numerous in western New Mexico. (See Figs. 67 and 70.)

Earthquakes. During volcanic eruptions, and oftentimes in mountain building, the rocks of the earth are cracked and perhaps ground against one another until the whole earth for miles around shakes from the blow, causing what we know as an *earthquake*. These are sometimes so severe that houses and bridges are shaken down. In countries subject to frequent earthquakes the houses are usually built of wood, and with only one or two stories, so that they will not easily be overthrown by an earthquake shock. Buildings twenty or more stories high, such as are found in many American cities, would be severely shaken and much damaged by a severe earthquake.

FIG. 70. *Devils Tower, Black Hills, Wyoming. Remnant of an old volcano.*

Earthquakes sometimes occur beneath the sea and start a great wave of water, much as a wave may be formed by suddenly striking the bottom of a pan of milk or water. Such a wave may travel toward the shore, increasing in height as it goes, and, advancing upon the land, may cause great damage and loss of life. In 1891 an earthquake wave struck the shore of Japan in the night and

swept away a large village, killing the people. The wave was not noticed out on the sea, for fishermen from that village knew nothing of it until they came ashore and found their village swept away. Sometimes earthquakes cause the land to crack open and make it rise or fall suddenly, but these effects are usually not so serious as those resulting from an earthquake wave.

FIG. 71. *Granite Needles, Black Hills, South Dakota. The strong rock has not worn away as rapidly as the weaker rock.*

Questions and Exercises

(1) Name some of the evidences of the interior heat of the earth. (2) Locate some famous hot springs; geysers; volcanoes.

(3) Locate the Yellowstone National Park and tell about its geysers and hot springs.

(4) Draw a picture of Mount Vesuvius or some other active volcano, indicating the *crater* and the *throat*. (5) Of what is the *cone* of the volcano composed? How is it built up? (6) Bring to the class a good description of an ascent of Mount Vesuvius, or find out something about the great eruption of Mont Pelée. (7) Locate Mount Etna; Stromboli; Mount Shasta; Fujiyama. (8) Draw a picture of one of these volcanic peaks and find out something of interest about it. (9) How does an eruption change the surface and aspect of a region? (10) Why may the Palisades of the Hudson be called a product of a volcanic eruption? (11) Why does the lava plug of an old volcano rise as a peak above the surrounding country?

(12) What are some of the results of earthquakes? (13) Mention a part of the world where earthquakes have been frequent lately.

(14) Find out about the last severe series of earthquakes in the United States. (15) Find out what part of our country has the most frequent earthquakes. (16) Why do severe earthquakes usually precede a volcanic eruption? (17) Name three volcanoes in North America. (18) Name the volcanoes in the Hawaiian Islands. (19) In Europe.

~~XI~~. *THE ATMOSPHERE*

The Air About Us. Extending over us to an unknown height, and beneath in the spaces between the rocks of the earth, and even, to a certain extent, in the water of the oceans, rivers, and lakes, there is a mixture of invisible gases, commonly called *air*. The portion of the air which lies above the surface of the earth is known as the *atmosphere*.

The atmosphere may be hot or cold, wet or dry, light or heavy. From our daily experience we are familiar with its changes in temperature and with changes in the amount of moisture that it contains. Differences of temperature produce the most conspicuous differences between winter and summer. Differences in weight produce those movements of air over the

FIG. 72. *Weathered peaks and slopes of loose detritus in South Dakota. Note how the strong rock layers protect the weak rock.*

surface of the ground which we call *winds*. Differences in the amount of moisture contained in the air determine whether the weather is *fair*, *cloudy*, or *stormy*.

Weather and Climate. The conditions of temperature, moisture, and weight of the air existing at any one time, together with the winds, give us our *weather*, and the average weather conditions of any place make up its *climate*.

Soil Making by the Atmosphere. The atmosphere is necessary to us in many ways. All animals breathe it, the land plants secure from it the greater part of their food, and it is the most importantagent in changing solid rock into fine, productive soil. The moisture in the air helps to rust or decay the rocks, just as it *weathers* an unpainted house. Water freezing in the rocks in winter, or very sudden changes in the temperature of rocks, cause them to break apart and become smaller. Anything that loosens the rock particles and helps the moisture in the air to penetrate into the earth, aids in the formation of soils. (See Fig. 72.) The loosened weaker portions of the rocks fall from their own weight and accumulate on the more gentle slopes. The strong portions of the rocks do not weather so rapidly and often stand up in fantastic columns or points. (See Figs. 71 and 72.)

FIG. 73. *A deep soil accumulation in North Carolina. Note the absence of boulders or ledges.*

In some parts of the world the rocks have decayed to a depth of hundreds of feet. (See Fig. 73.) This decayed material forms the detritus which slowly creeps down hill because of its weight, and is carried away by rivers and other agencies which we shall study later. The finer surface portion of this detritus is mixed with more or less decaying vegetable matter from the trees and grasses, and forms what we know as *soil*.

Temperature of the Air. We measure the temperature of the air by means of a *thermometer*, or heat measurer. Most thermometers consist of a glass tube containing a small quantity of mercury. At the temperature of freezing the mercury stands at a certain point which, in the thermometer we generally use, known as a Fahrenheit thermometer, we call 32 degrees. At the temperature of boiling water the mercury stands at 212 degrees. The glass tube between these limits is divided into 180 equal spaces, each of which is a degree, and we measure the temperature of the air at any time by noting the height of the mercury in degrees.

A temperature of 68 degrees is considered the most healthful temperature for our houses in winter. A temperature of between 90 and 100 degrees is that of a very hot summer day. Temperatures below 32 degrees are those of the colder part of winter, and a temperature of more than 32 degrees below the freezing point is said to be below zero. Such temperatures are very cold, but are

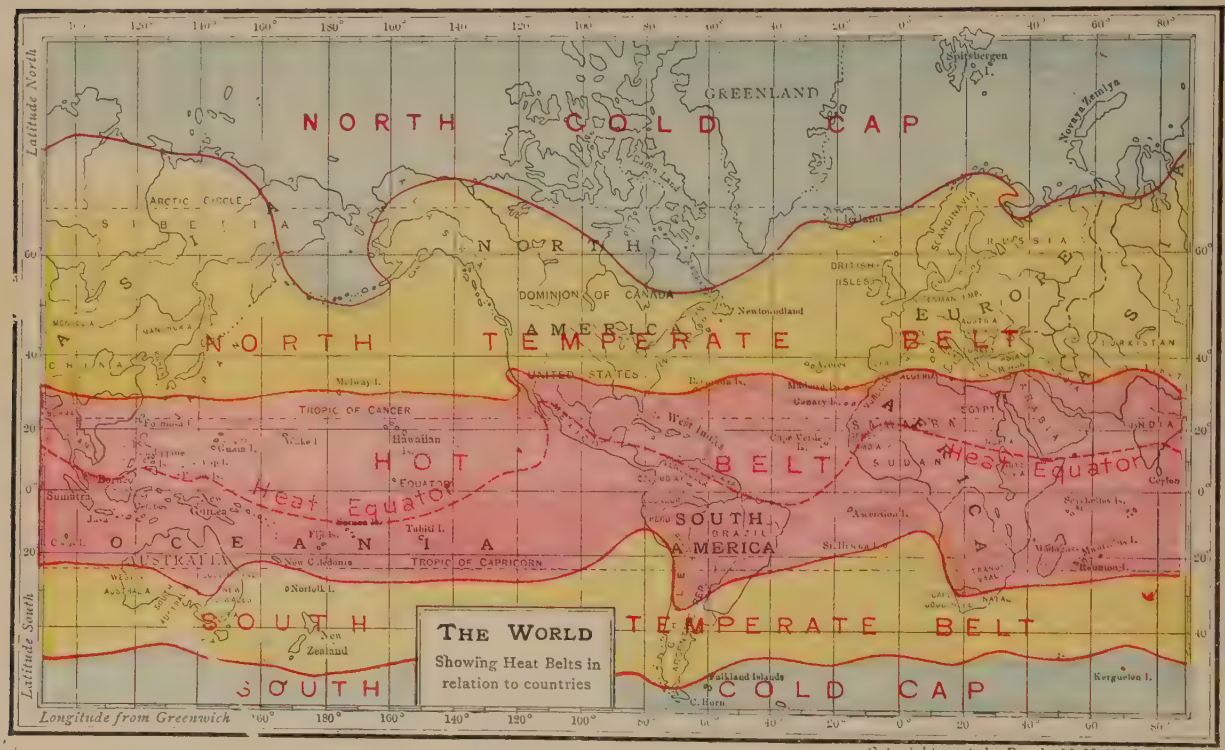

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FIG. 74. *A map of the world, showing the Heat Belts.*

often experienced in a large part of our country during the coldest winter weather.

It is hotter in summer than at any other time. At that time the sun's rays strike the earth more nearly vertically, and are scattered over a smaller amount of surface. (See Fig. 75.) An area of a certain size gets more heat when the sun shines from high in the heavens and the shadows are shorter than when it shines obliquely.

The hottest part of the day is usually in the early afternoon and not exactly at noon, because the heat has been accumulating longer. For the same reason the hottest part of the summer in our country is in July and August instead of in June, when the sun rises highest in the heavens.

The Temperature of Land and Water. If the land and water were heated with equal ease, and if they retained their heat equally well, the earth could be divided into five bands, separated from each other by the parallels of latitude which bound the zones of sunlight. But the land is warmed more rapidly than the water and cools off more rapidly. The warmth received by the ocean is carried to different parts of the world, as the ocean waters are constantly in motion in a series of ocean currents, but that received by the land is concentrated. Chiefly because of these facts the boundaries between the several belts of temperature do not coincide with the tropics and circles, although they run in a general east-west direction. (See Fig. 74.)

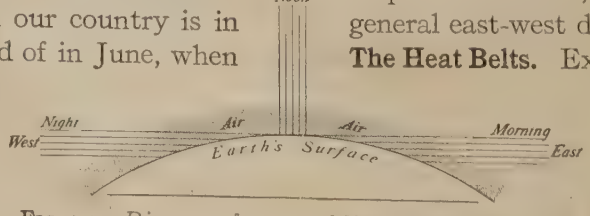

FIG. 75. *Diagram of a ray of light striking the earth vertically and obliquely. Notice the difference in space covered.*

The Heat Belts. Extending about the world on both sides of the equator is the broad band known as the *Hot Belt*, in which the average temperature of the year is more than 68

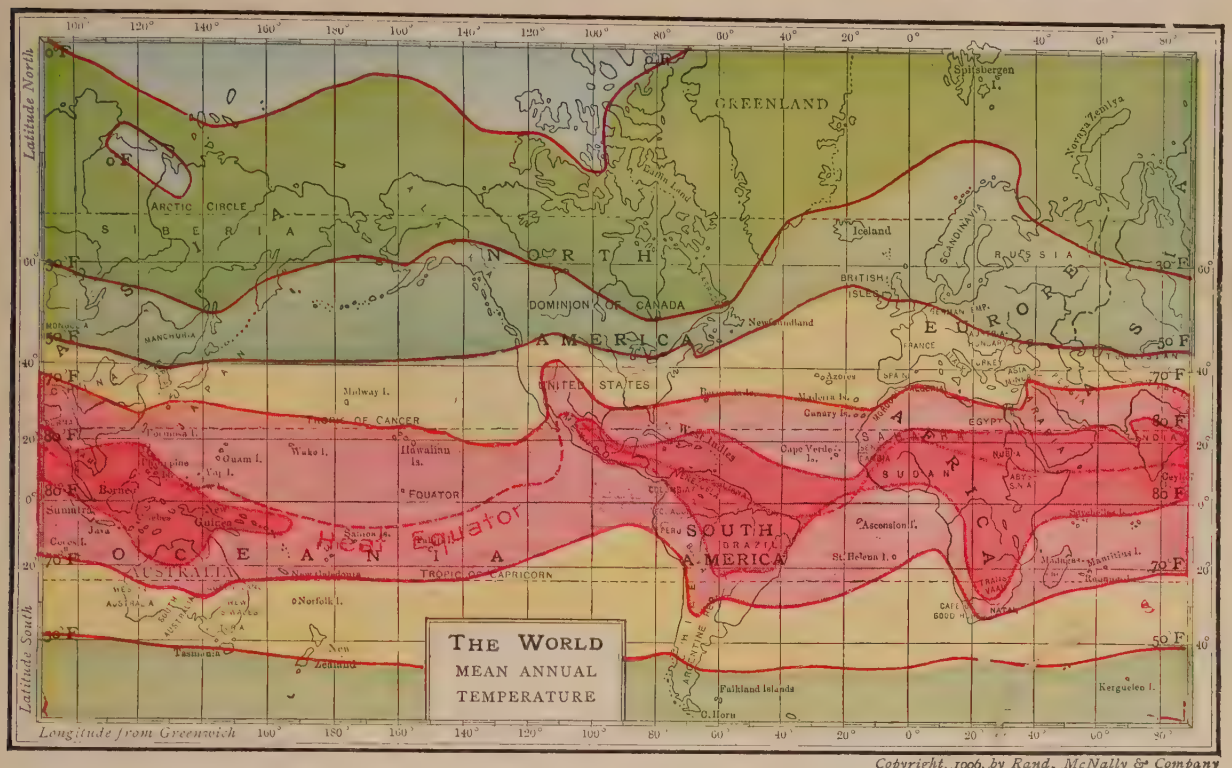

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FIG. 76. *A map of the world, showing the mean annual temperature.*

degrees. This belt extends farther poleward and is broader over the land than over the ocean, because the land is more readily warmed than the ocean. It extends farther into the Northern Hemisphere than into the Southern, because there is more land in the Northern Hemisphere. (See Figs. 74 and 77.)

About the poles are two areas known as the *North* and *South Cold Caps*, in which the average temperature of the warmest month of the year is never above 50 degrees. (See Fig. 74.) This is the average summer temperature required to ripen the most hardy grains. The South Cold Cap extends much farther toward the equator than the North Cold Cap, because there is so much more land near the north pole than the south.

Between these limits are two areas known as the *North* and the *South Temperate Belts*. (See Fig. 74.) The North Temperate Belt contains far more land than the South Temperate Belt, is much broader, and includes the most progressive countries of the world.

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FIG. 77. *Range of the Heat Equator.*

On each meridian there is some one place in the Hot Belt that has a higher average temperature than any point

north or south. The line connecting these places is known as the *Heat Equator.* (See Fig. 76.) In our summer, when the sun shines more nearly vertically in the Northern Hemisphere, the Heat Equator is, of course, much farther north than in our winter. Its average position is shown on the map. (See Fig. 74.) We shall find that this Heat Equator is of great importance in helping to explain the various wind systems of the world.

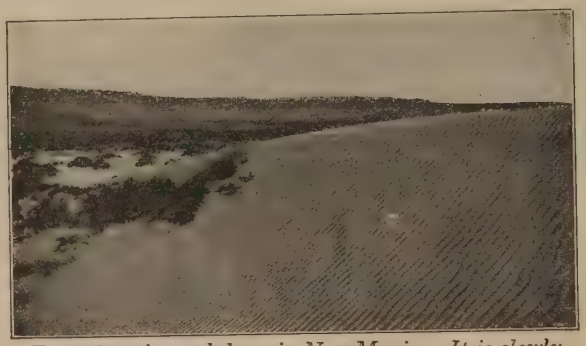

FIG. 78. *A sand dune in New Mexico. It is slowly burying trees and shrubs.*

Questions and Exercises

(1) What is the temperature of your schoolroom at this moment? What is the lowest temperature you have ever experienced? The highest? Describe the effects of cold and heat on you and on your surroundings.

(2) Keep a record of the outdoor temperature for one month, taking three readings daily. Find the average temperature for the month. Note the day in which there was the greatest *range* of temperature. (3) Keep a daily record of temperature for the month of January, and find the average for the month. Compare your results with the January isotherm for your region.

(4) Study the extent of the Hot Belt in the Eastern and Western Hemispheres. In which Hemisphere is it the wider? Why does it reach farther north in Eurasia than in North America? (5) Make a list of the countries of North and South America which are in the Hot Belt in July; in January. Underline those countries which are always in the Hot Belt. (6) Make a list of the countries of the world which are crossed by the Heat Equator in July. (7) Make a list of the progressive nations of the world in the North Temperate Belt.

(8) Break open a weathered pebble and compare the appearance of the inside with the outside. Explain what you see. Explain why it is often hard to decipher the inscriptions on ancient stone monuments.

(9) How do earthworms help in soil making? Find out why a farmer often plows his land in the autumn.

XII. THE GREAT WIND SYSTEMS OF THE WORLD

Winds and Calms. *Air moving horizontally is called a wind.* When you hold up your moistened finger and do not feel it colder on one side than on the other there is no wind. The air is then either quiet, or rising or falling, and we have what we call a *calm.* Winds are produced by differences in the weight of the air in different places. It is the force of the moving air that turns mills, speeds sailing vessels, and bends trees in a storm. It is the wind also that carries along the sand on a beach or desert and piles it in great hills known as *sand dunes.* (See Fig. 78.)

FIG. 79. *A simple barometer.*

The Barometer and Its Use. The weight of the air is determined by an instrument known as a weight measurer, or *barometer.* The best barometers are made of a U-shaped tube of glass with one side of the "U" nearly a yard long and closed at the upper end. The other side is only a few inches long and is open at the end so that the air can readily reach the liquid. (See Fig. 79.) The tube is filled with mercury and then placed in a vertical position. The mercury will fall from the top of the long arm until at the seashore over a large part of the world there is a difference of thirty inches in the height of the mercury in the two arms of the U-shaped tube. As the air is the only thing pressing upon the liquid, it is clear that this is what holds up the mercury in the long column. If the weight of air decreases, it does not press so hard on the mercury in the short arm of the tube and therefore the mercury falls in

the long arm. By measuring the height of the column of mercury held up by the air which presses down on the mouth of the tube, we can ascertain the weight of the air.

As one ascends, the air is lighter and the mercury in the barometer consequently falls. If the pressure at sea level is thirty inches, it will be twenty-nine inches at a height of 910 feet, twenty-eight inches at 1,850 feet, twenty-seven inches at 2,820 feet, and twenty inches at 10,550 feet, which last height is about that of the city of Leadville, Colorado. It is by noting the pressure of the air at different heights, and by comparing this pressure with that at the seashore at the same time, that we can most readily measure the height or *altitude* of elevations above the level of the sea.

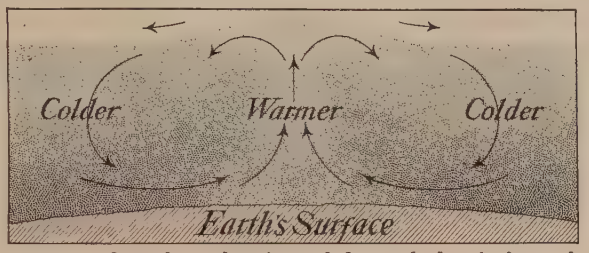

FIG. 80. *Over the cool regions of the earth the air descends and moves toward the warmer regions, where it rises.*

The Trade Winds. By observing that in a room the warm air rises to the ceiling, while the colder air is near the floor, we learn that cold air is heavier than warm air. The coldest parts of the world generally have heavier air than the warmest. (See Figs. 80 and 83.) Over those portions of the earth just north and south of the Heat Equator the cooler, heavier air is continually moving toward the lighter belt near the Heat Equator, forming the great system of winds known as the *Trade Winds*. (See Fig. 81.) These trade winds are the most constant winds of the world, and are so named because they blow regularly along a definite path.

As the air approaches the Heat Equator it rapidly becomes warmer and is therefore better able to absorb moisture. Hence the trade-wind area, especially over the oceans, is a great *fair weather* belt. The sky and sea are beautifully blue, few clouds are seen, and the brisk moving air is invigorating. Where the trade winds blow over the land far from any ocean, they can take up more water than the land will furnish. Thus such regions are deserts with very little rainfall and almost continually clear blue sky. The best illustration of a trade-wind desert is the Sahara in northern Africa.

We should expect the trade winds to blow due north or south, but as the earth is continually rotating from west to east the winds are deflected from a straight north-south course. All winds moving over the surface of the world are turned to the right of their course in the Northern Hemisphere and to the left in the Southern Hemisphere. Therefore the trade winds blow from the northeast in the Northern Hemisphere and from the southeast in the Southern Hemisphere.

FIG. 81. *The wind systems of the world.*

Doldrums. At the Heat Equator the warm, light air rises, and at a great height flows off toward the polar regions of the world.

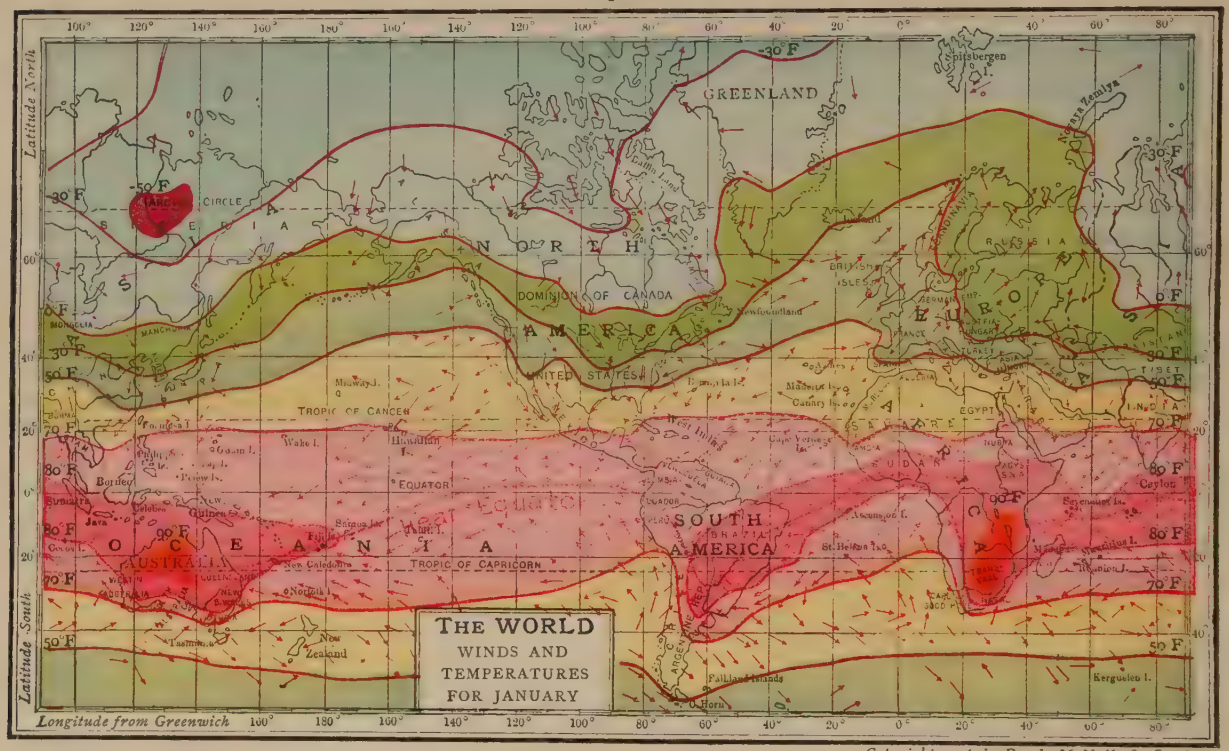

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FIG. 82. *Winds and temperatures of the world for January*

Immediately bordering the Heat Equator, therefore, is a region where the air is slowly ascending, and where at the surface we have an area of calms known as the *Doldrums*. (See Fig. 81.) Years ago, when the larger part of our commerce was carried on by sailing vessels, the doldrum belt was the source of much annoyance to sailors, because they might have to wait for weeks for enough wind to carry them across into the trade-wind area on the other side. The doldrum belt is strikingly contrasted with the trade-wind region because it is an area of excessive rainfall and little fair weather. The air in the doldrums is always warm, moist, and depressing, much like a very uncomfortable summer day in the eastern United States.

FIG. 83. *Diagram of the earth showing the general movements of the atmosphere.*

Monsoons. As the Heat Equator during a large part of the year is in the Northern Hemisphere, the southern trade winds must then blow across the equator into the Northern Hemisphere to reach the doldrum belt. These southeast winds are turned to the right when they cross the equator into the Northern Hemisphere and become *southwest* winds. In the same way winds that have to blow into

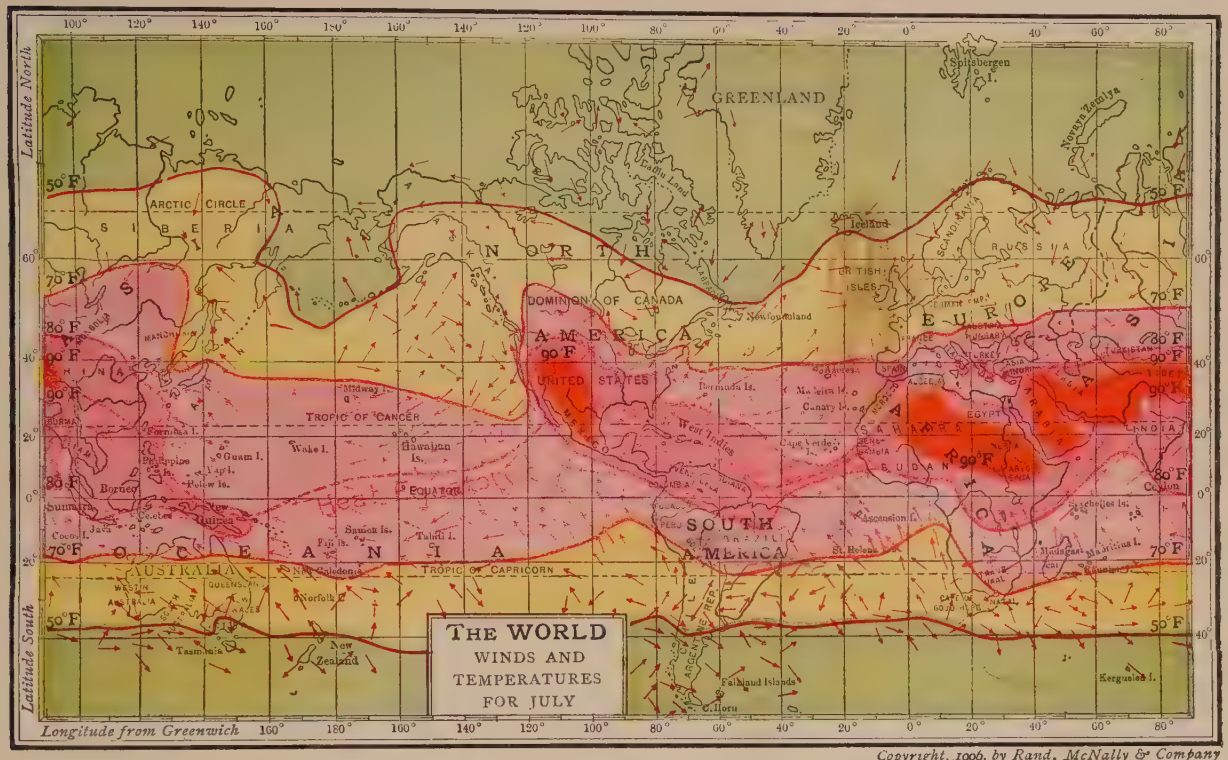

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FIG. 84. *Winds and temperatures of the world for July.*

the Southern Hemisphere, when the Heat Equator is in this hemisphere, are turned from a northeast direction into a *northwest* direction when they cross the equator. There are, therefore, certain areas in the world which receive their winter winds from one direction and their summer winds from the opposite direction. These winds which change with the season are known as *Monsoons*. The best developed monsoon winds are found in India and along the southeastern coast of Asia.

Horse Latitudes and Westerlies. At about one-third the distance from the equator to each pole there is a belt where the weight of the air is on an average somewhat greater than at the equator. Over these belts the air is descending to take the place of the surface air flowing toward the equator and toward the poles. The result at the surface is a series of calms known as the *Horse Latitudes*. (See Fig. 83.)

These horse latitudes are boundaries, not only of the trade winds, but of the great series of winds known as the *Stormy*, or *Prevailing Westerly Winds*. (See Fig. 83.) The westerly winds circle round and round the world, blowing from the west-southwest in our hemisphere, and from the west-northwest in the Southern Hemisphere. They exist throughout the larger part of the temperate belts, and so blow over the regions occupied by the chief nations of the world. These winds are interrupted by frequent storms, during which the wind may blow from almost any direction. The prevailing direction, however, is from some point in the west.

In the Southern Hemisphere these winds are strong and constant, as the air moves mostly over the ocean, and is not turned from its course by the land. Here they are known as the *Brave West Winds*, because of their strength, or the *Roaring Forties*, from the latitudes in which they are best developed. Sailing vessels between England and Australia

are borne eastward by these winds and find it easier to be carried on by them around South America and back to England than to try to face them in a return voyage around Africa.

Polar Winds. The other important winds of the world are the *Polar Winds*. These originate in the polar regions and blow from the northeast in our hemisphere and from the southeast in the Southern Hemisphere. Little is known concerning them.

Summer and Winter Winds. The areas of the world over which the great wind systems blow are not the same in the summer as in the winter, because the weight of the air is differently distributed in the two seasons, owing to the differences in the distribution of temperature. (See Figs. 82, 84, and 85.) These winds are much more constant over the ocean than over the land, because the lands are so much colder at one season and warmer at the other than the adjoining ocean, and also because the lands are crossed by mountain ranges and high plateaus which turn the winds from their course.

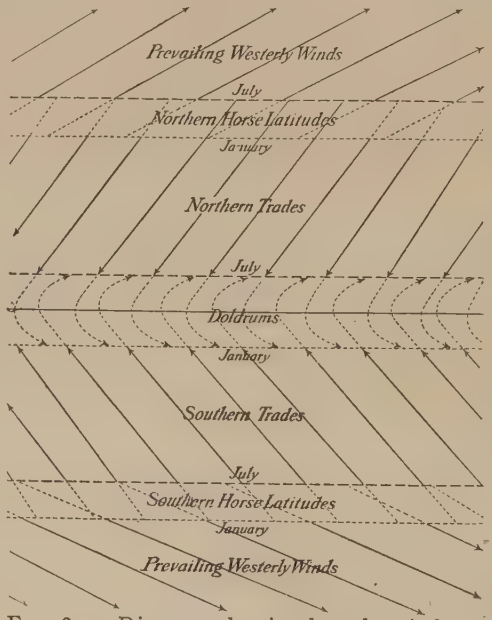

FIG. 85. *Diagram showing how the wind systems of the earth move north and south between summer and winter.*

In the region of the stormy westerly winds the continents are much colder in winter than the oceans, especially in the Northern Hemisphere, and warmer than the oceans in summer. Therefore, along the eastern coast of the United States, for instance, the cold winds blow from the continent in the winter and toward the continent in the summer, always blowing from the area of colder, heavier air to that of warmer, lighter air.

Sea Breezes and Mountain Winds. At certain seasons of the year in regions bordering a large body of water the winds may change twice a day. In the daytime, when the water is cooler than the land, the wind blows from the water to the land, forming a *sea breeze*. (See Fig. 86.) At night, when the land is colder than the water, the wind blows in the opposite direction, forming a *land breeze*. (See Fig. 87.) At the time when the wind is changing from one direction to another there is, of course, a calm.

In those parts of the world where there are high plateaus or mountains, the wind, as a rule, changes its direction twice daily. At night the wind blows down the mountain valleys into the lower land, beginning first as a gentle breeze, and gradually developing into a strong wind, known as a *mountain wind*. In the daytime the warmer air of the valleys moves up the mountain slopes in the opposite direction, forming a *valley wind*. This change of direction is so constant in the summer in some of our western mountains that a hunter sleeping near a camp fire will often go to sleep up the valley from the fire to escape the smoke, so certain is he that before morning the wind will blow from that direction.

Questions and Exercises

(1) Open the window in your schoolroom, or in some room at home, six inches at the top and six inches at the bottom. Hold strips of thin paper at the top and bottom and notice which way the paper moves. Make a drawing showing the movement of the air in the room. How is a similar movement illustrated by a fire in a grate? Draw arrows showing the indraught of cooler air and the upward movement of heated air. Show by a drawing how the movement of air in a fireplace is like that in the doldrum belt.

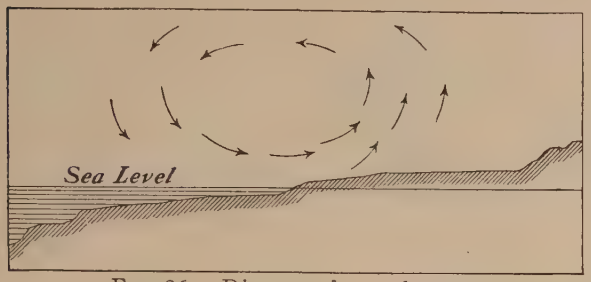

FIG. 86. *Diagram of a sea breeze.*

(2) On an outline map of our continent draw arrows showing the direction of the trade winds. On this map write the names of the countries blown over by the trade winds. Locate two cities in this belt. (3) On the map used in Exercise 2 draw arrows to show the direction of the stormy westerlies. Write the names of the countries in this wind belt. Locate two cities on the western and two on the eastern coast of our continent. (4) On an outline map of the world draw arrows showing the direction of the trade winds; the westerlies. Indicate the doldrums and the horse latitudes.

(5) Explain how a barometer measures the weight of the air. Relate something from your own experience that shows that air has weight. (6) Along with your temperature record keep a daily record of the air pressure and of the direction of the wind. Find out the prevailing direction of the wind for a month. (7) Explain why certain winds in the Southern Hemisphere are called the "roaring forties." Who was the first European mariner to drive his ship westward in the face of these winds? (8) In which hemisphere do the northeast trade winds blow over the greatest extent of land? The westerlies? (9) Make a list of the desert regions over which the trade winds blow.

(10) Which winds bring rainy weather to your home? Clear weather? Give the reason in each case. (11) Write a composition on what you have noticed about sea breezes. Tell what time of day the breeze sprang up, its effect on the water, and on you; when it died down; its effect on sailboats; any experience you may have had which was connected with such a breeze.

(12) If you live inland, why does not the barometer ordinarily stand at thirty inches?

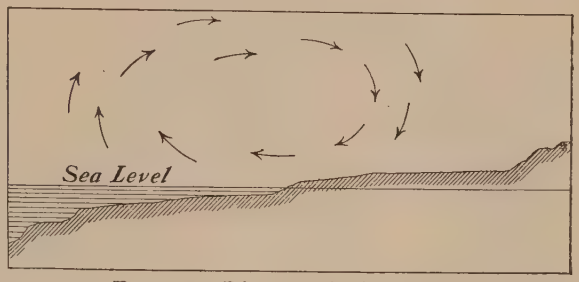

FIG. 87. *Diagram of a land breeze.*

XIII. RAINFALL AND ITS DISTRIBUTION; STORMS

Moisture in the Air; Deserts. Everywhere in the world the air contains some moisture. Warm air can hold more moisture than cold air, and warm air if chilled will lose a certain amount of its moisture. Thus, we often see moisture condense in drops on the cold window pane of the laundry or the railroad car.

Days in which the amount of moisture in the air is small in proportion to what it might hold at that same temperature are dry days. On such days drumheads are tight, postage stamps do not stick together, and hair will crackle as it is combed. When the air is full of moisture, even though we cannot see it in drops, the days are damp. On such days one perspires freely and feels uncomfortable.

In certain parts of the world it is always dry, and there is so little moisture in the air that it rarely rains. Such regions we know as *deserts*. (See Fig. 97.) In other parts of the world the air is always moist, and whenever it is cooled some of the moisture condenses as fog, or dew, or rain.

FIG. 88. *A flat-roofed house in New Mexico. Owing to the small rainfall, peaked roofs are unnecessary.*

The Causes of Rainfall. All of the moisture that comes to the surface of the earth in the shape of fog, dew, snow, or rain is called its *rainfall*, and

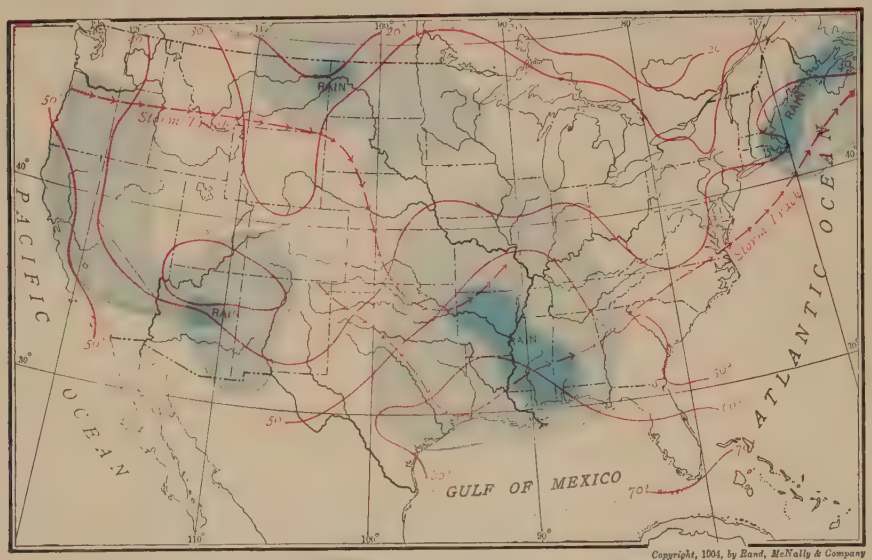

FIG. 89. *Temperature, cloudiness, and rainfall, February 27, 1902.*

anything that will cool the air so as to cause it to deposit its moisture will produce rainfall.

In the doldrum belt the warm, moisture-laden air brought by the trade winds is continually rising and cooling; hence in much of this region it rains daily. (See Fig. 97.) As the doldrum belt moves north and south, the regions over which it passes have a rainy season and then a dry season.

Whenever winds are obliged to move over mountains the air is cooled and rainfall usually follows. Trade winds thus produce rainfall on the coast of Brazil and eastern Australia, and the prevailing westerlies produce rainfall on the northwestern coast of America, in the northern British Isles, and in Norway. (See Fig. 97.)

Descending air grows warmer constantly, gaining one degree of temperature for about every 300 feet of decrease in height. As it gains in temperature it becomes better able to absorb moisture. The air descending over the land cannot usually secure all the moisture it can hold, and is therefore dry. Thus the leeward side of mountain ranges is usually drier than the windward side, as in Australia and the western United States. (See Fig. 97.)

Storms or Cyclones. Almost the whole of the United States, like other regions lying in the path of the prevailing westerly winds, has frequent storms. These storms are regions of light air, toward which the heavier air flows from all sides. Toward the center of a storm the barometer falls, because of the decreased weight of the air. Therefore, a storm center is known as a *low*. Such storms or *cyclones* move from west to east across

FIG. 90. *Atmospheric pressure and winds, February 27, 1902.*

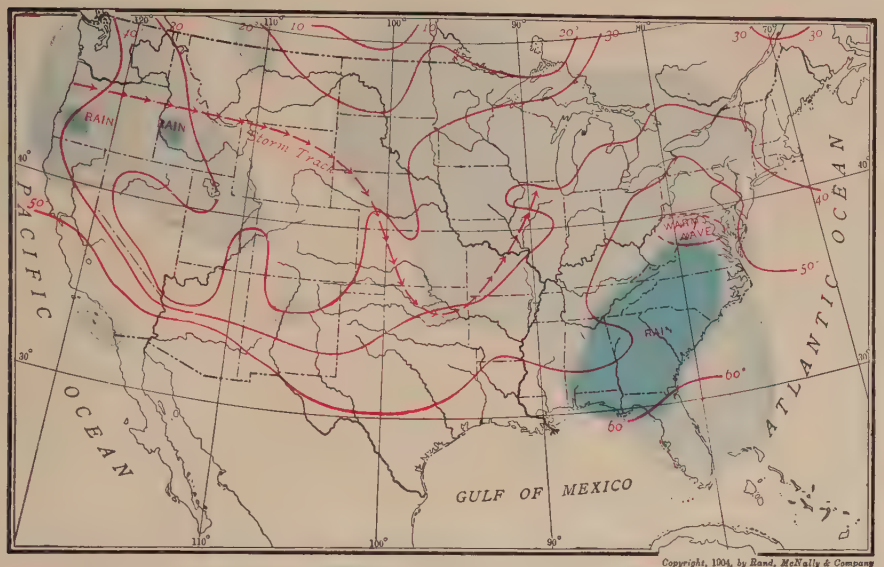

FIG. 91. *Temperature, cloudiness, and rainfall, February 28, 1902.*

the country, whirling as they go and often drawing the air in toward them for many hundreds of miles. (See Figs. 90, 92, and 96.)

Whenever a storm occurs, the air rushing in from all sides is drawn upward to high altitudes, circling around the center of the storm as water circles about the opening in the bottom of a basin as it flows out. If the air is drawn from over the ocean, it takes in a large amount of moisture which falls as rain when the air rises near the center of the storm. Thus those regions which have frequent storms, as do the areas of the prevailing westerly winds, have also frequent rains. In studying the distribution of rainfall over the world (see Figs. 89, 91, and 93) it should be remembered that snow is considered as rainfall, and that it is measured as rain because we know how much water will be formed by the melting of a given mass of snow. The rainiest region of the world is in India, where the warm, moist air of the southwest monsoon, as it rises, is cooled on the sides of the mountains. The rainfall here is often as much in a day as the northeastern United States gets in a year.

— **Storm Winds.** In the beginning of a storm in the eastern United States the wind usually blows from the northeast or southeast, increasing in intensity as the storm center comes nearer to us. As the storm center passes and the clouds break away, the wind changes into some quarter of the west.

In winter the fair-weather winds are usually from the northwest. They are very cold and dry and may cause such sudden changes of temperature that we have a *cold*

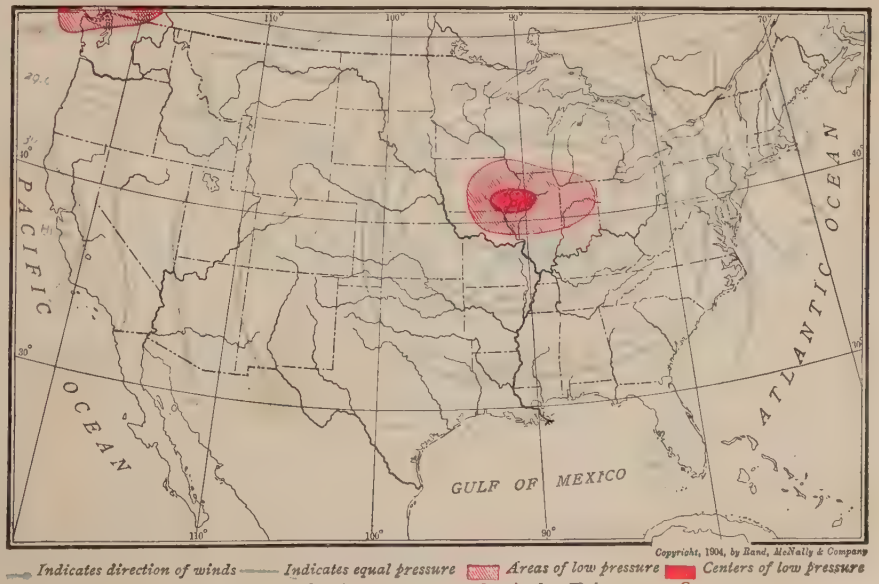

FIG. 92. *Atmospheric pressure and winds, February 28, 1902.*

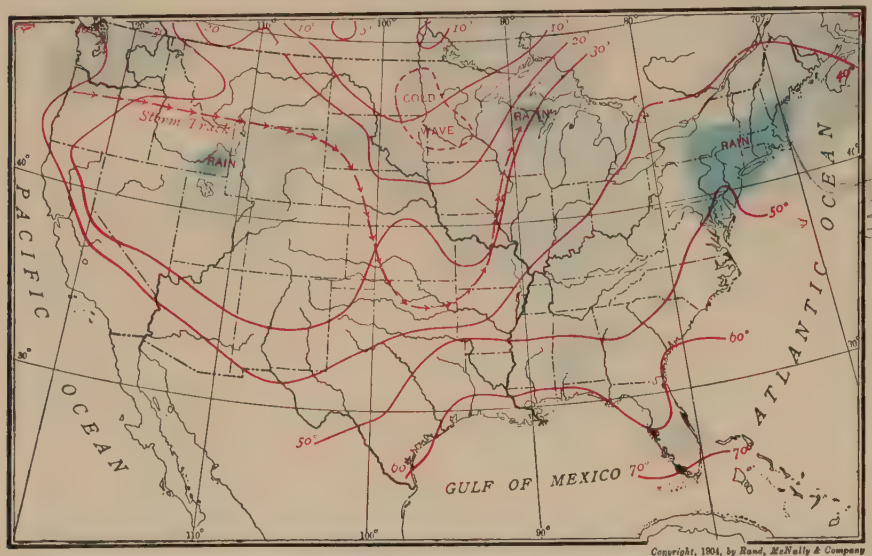

FIG. 93. *Temperature, cloudiness, and rainfall, March 1, 1902.*

wave. (See Fig. 94.) Such a northwest wind may blow for several days, the cold increasing and the barometer constantly rising. There may finally come a period of fair, calm weather. This shows that we are in an area of high pressure which follows the low pressure of the storm. (See Fig. 95.) It is then we have our coldest winter weather.

The oncoming of a storm, therefore, is usually marked by the falling of the barometer, due to the lightness and moisture of the air, and the oncoming of fair weather by the rising of the barometer, due to the dryness and heaviness of the air. The weight of the air changes much more rapidly in the winter than in the summer, and so we have our strongest winds in the winter and, with few exceptions, our severest storms.

Tropical Storms. In the autumn months we sometimes have, along the eastern and southern coasts of the United States, very severe storms, much like our winter storms, except that they have developed in the tropics and moved north into our latitude. They occur not only along our coast, but also along the southeastern coast of Asia, where they are called *typhoons*. These storms are known as *tropical cyclones*, to contrast them with the cyclones which originate in the belts of westerly winds. Except for the rains of the rainy season, these are the only storms in the trade-wind belt.

Tornadoes. In the central and eastern part of our country in the spring months we sometimes have local but very intense storms known as *tornadoes*. These usually occur on warm days when the surface air is very hot and full of moisture and when the overlying air is heavy and cold. Finally the warm

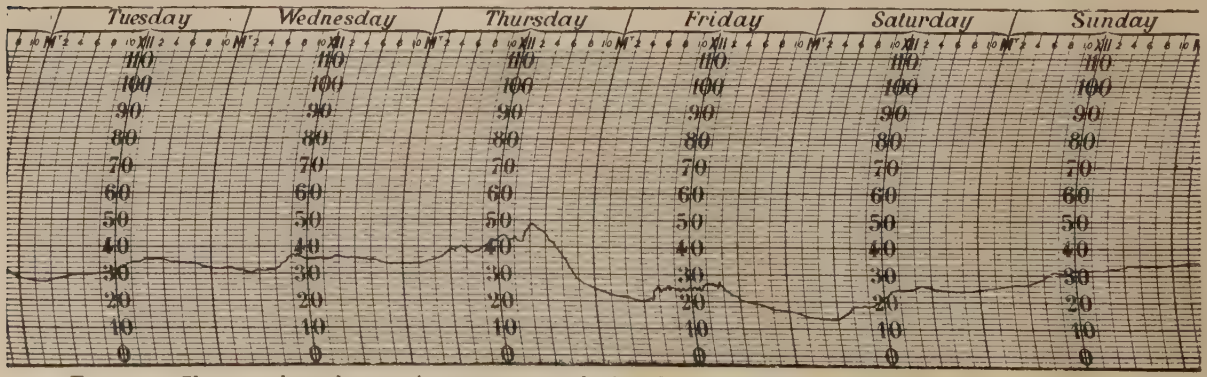

FIG. 94. *Chart to show changes in temperature during the passage of a cyclone followed by a cold wave.*

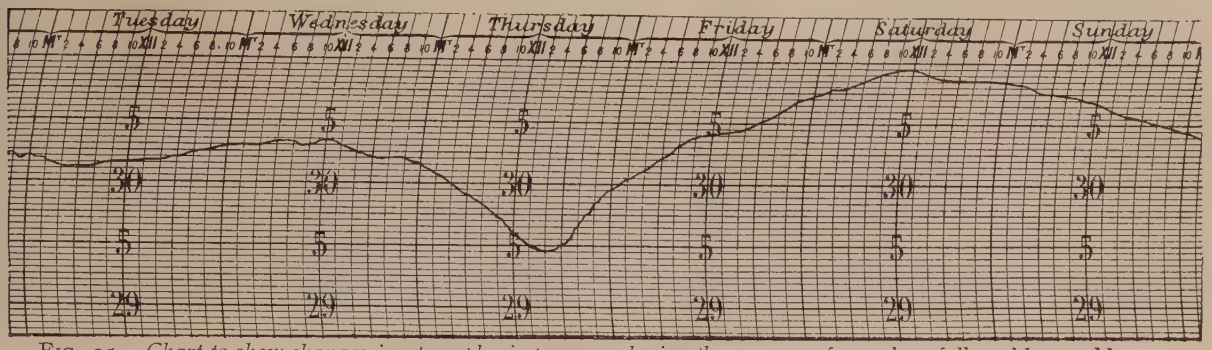

FIG. 95. *Chart to show changes in atmospheric pressure during the passage of a cyclone followed by a cold wave.*

air rises, the cold air falls, and a terrific whirling wind is developed, followed by heavy rainfall. A tornado often causes an enormous amount of damage.

Questions and Exercises

(1) Tell where you have seen moisture condensing. (2) Where was the moisture before it was condensed into drops? (3) What caused it to condense? (4) Make a list of all the forms of moisture that you are familiar with. Which form is the most common where you live? (5) Which wind most frequently brings this moisture?

(6) Explain why the trade-wind belt contains many deserts. (7) Make a list of the countries in some one continent which lie in the westerlies and which have a heavy rainfall. Opposite each country write one cause of such rainfall. Do the same for the trade winds. (8) Make a list of the countries in the westerlies which have a light rainfall.

(9) Why should there be daily rains in the doldrums? (10) At what time of day do these rains occur? (11) Why should portions of the trade wind belt have two rainy seasons? At what times of the year will these seasons occur? (12) Locate the two heaviest belts of rain in the United States. (13) Why are Nevada and Arizona largely desert regions?

(14) Draw a diagram showing the difference in rainfall between the windward and leeward sides of a mountain range. (15) What mountain range in the westerly-wind belt might your diagram illustrate? In the trade-wind belt? (16) What difference in vegetation does this difference in rainfall produce? In industries? In the density of population?

(17) From which direction does the wind generally blow at your home when a storm begins? (18) From which direction does the wind come when the storm begins to clear? (19) From which direction does a storm generally come to you? (20) Toward what section of the country does it generally pass from you? (21) When a storm center is just west of the central Mississippi Valley, what would be the probable direction of the wind at Memphis? At Cincinnati? At Pittsburg? At Atlanta? (22) What portion of the country would have rain? Clear weather?

(23) Compare the rainfall of Winnipeg and New Orleans and account for the difference. (24) How does the difference in the amount of rainfall in eastern and western Nebraska affect its industries? Its population?

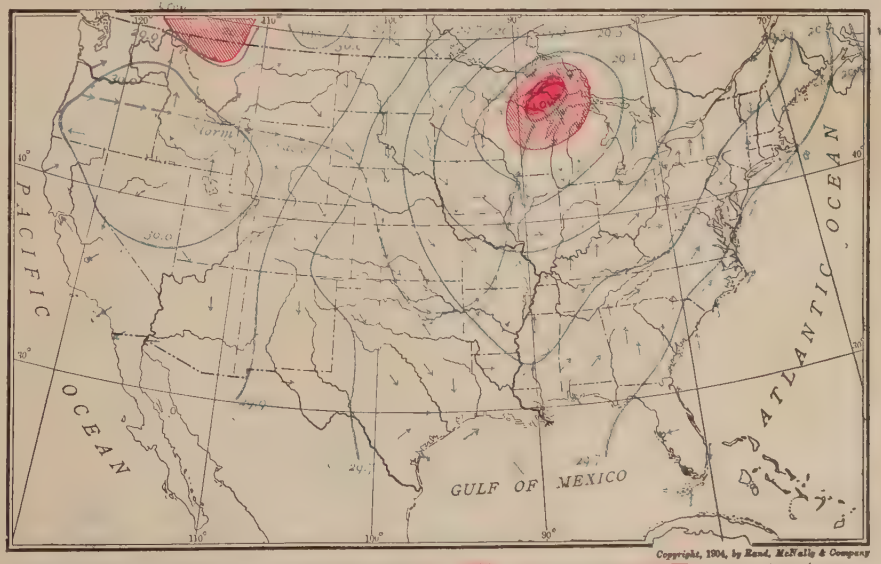

FIG. 96. *Atmospheric pressure and winds, March 1, 1902.*

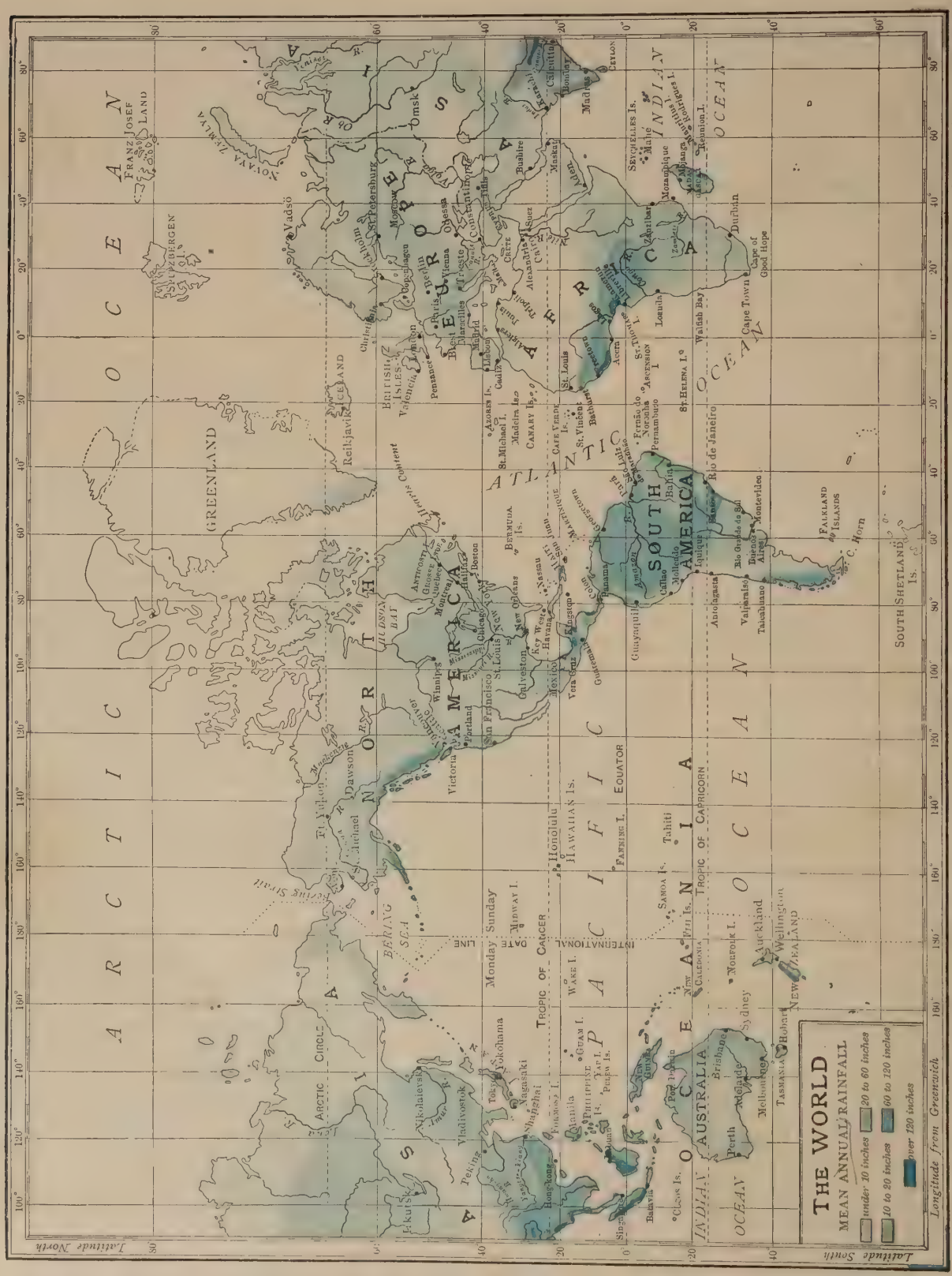
THE WORLD
MEAN ANNUAL RAINFALL
under 10 inches
10 to 20 inches
20 to 60 inches
60 to 120 inches
over 120 inches
Longitude from Greenwich
Latitude North
Latitude South
ARCTIC OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN
NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AUSTRALIA
GREENLAND
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FIG. 97.

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FIG. 98. *A map of the world showing the ocean currents.*

XIV. THE OCEANS

The Ocean Currents. The water of each ocean is continually circling about in its ocean basin, giving us a system of *ocean currents* or *eddies*. Bordering the equator, where the trade winds blow from the northeast or southeast, the waters of the ocean are blown toward the west until they are deflected by the continents. (See Fig. 98.) Turning then toward the poles, and being deflected, like the winds, to the right in the Northern Hemisphere and to the left in the Southern Hemisphere, they flow away from the equator until they move into the region of the westerly winds. They are then blown along to the eastward until they again strike the continents, when they turn again toward the equator. The currents in the northern oceans move from the east to the west along the equator, then to the north and again to the south, swinging round in the same direction as the hands of a watch. The direction of the southern currents is, of course, opposite to the direction of the hands of a watch.

The Great Eddies. These systems of currents are named from the ocean in which they occur, as the *North Atlantic Eddy*, the *South Atlantic Eddy*, the *North Pacific Eddy*, the *South Pacific Eddy*, and the *North* and *South Indian Eddies*. (See Fig. 98.) Around the south pole is the great eddy of the Antarctic Ocean, which is moving constantly eastward, in the same direction as the southern part of the eddies of the several oceans. In the center of each of the great eddies there is an area of quiet water with but little motion. The direction of the ocean currents is so much like that of the prevailing winds in the different regions that it is believed that the winds are the chief cause of the ocean currents.

Currents of the Indian Ocean. The best proof that the wind produces the ocean

FIG. 99. *The direction of the currents in the Indian Ocean in summer.*

currents is the fact that in the northern Indian Ocean the currents change their direction in accordance with the direction of the monsoon winds. In the summer, when the southwest monsoon blows over this region, the currents move from west to east in the northern part of the ocean, and from east to west in the southern part. In the winter, when the northeast monsoon blows, the currents change their direction and move from east to west in the northern part of the ocean, and from west to east in the southern part. (See Figs. 99 and 101.)

Warm and Cold Currents. Certain portions of the system of ocean currents are particularly well known and have been definitely named. For instance, in the North Atlantic there is a stream of water issuing from the Gulf of Mexico known as the *Gulf Stream*. (See Fig. 98.) This stream of clear warm water unites with the western portion of the North Atlantic Eddy, called the *North Atlantic Drift*, because of the slow motion it has, and is not distinguished as a separate current north of Cape Hatteras. A similar current, known as the *Japan Current*, or *Kuro Shiwo*, extends from Japan part way across the Pacific Ocean. (See Fig. 98.) A cold current, known as the *Labrador Current*, creeps down along the eastern coast of North America until it finally settles beneath the waters of the North Atlantic Drift off the coast of New England.

Importance of Ocean Currents. The system of ocean currents keeps the waters of the ocean constantly in motion, so that no part of it gets unduly warm. As the westerly winds move across the warm ocean in winter they are tempered by the warm water, and reach

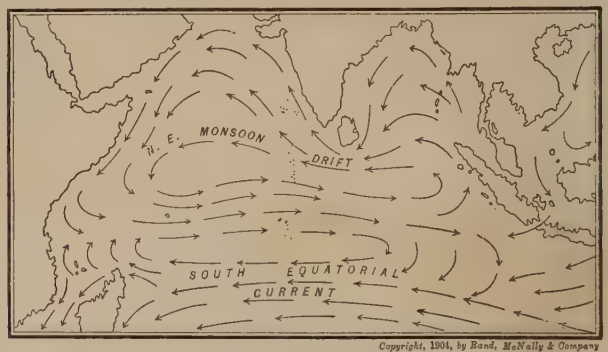

FIG. 101. *The direction of the currents in the Indian Ocean in winter.*

the continents to the east very much warmer than they were when they started across the ocean from the continents to the west. It is for this reason that the northwestern coasts of North America and Eurasia are so much warmer in winter than the northeastern coasts at the same distance from the equator.

The ocean currents are also important because they aid vessels going in the direction of their flow, and impede vessels going in the opposite direction. Columbus in his voyage to America had to sail against both the currents and the winds until he finally came into the trade winds which blew him along to the island of San Salvador. In a recent voyage across the Atlantic, in

FIG. 100. *Waves breaking on a boulder-strewn Californian shore.*

a small boat, a bottle was thrown overboard. After floating for two years, it was cast ashore on the island of San Salvador almost at the foot of the monument which was built there to commemorate the discovery of the island by Columbus.

FIG. 102. *A beach of sand and pebbles. Notice the wall built to protect the cliff from the action of the waves.*

Questions and Exercises

(1) Fill out the following chart, using the globe in getting your answers:

The Atlantic Ocean is bounded	(*a*) on the north by	
	(*b*) on the south by	
	(*c*) on the east by	
	(*d*) on the west by	
The Pacific Ocean is bounded	(*a*) on the north by	
	(*b*) on the south by	
	(*c*) on the east by	
	(*d*) on the west by	
The Arctic Ocean is enclosed	(*a*) by	

(2) On an outline map of the world show by arrows the eddies in the North Atlantic, South Atlantic, North Pacific, South Pacific, and Indian oceans. (3) Which part of the North Atlantic Eddy carries warm water northward? Which part of the South Atlantic Eddy carries warm water southward? Which part of the South Atlantic Eddy carries cool water northward? Which part of the South Pacific Eddy carries cool water northward? (4) On the outline map used in Exercise 2, write the words "warm" and "cool" over the corresponding parts of the eddies.

(5) Why are the waters on the coast of Maine colder than those along Marthas Vineyard? Why do fogs prevail where the Labrador Current and North Atlantic Drift meet?

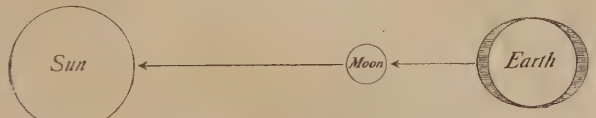

FIG. 103. *Diagram showing the formation of tides at time of new moon.*

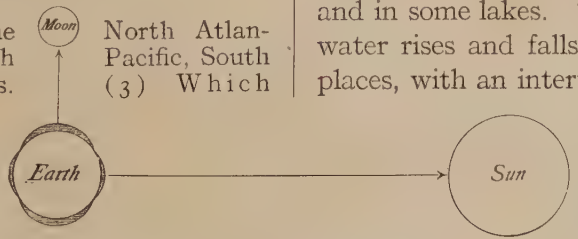

FIG. 104. *Diagram showing formation of tides at a time halfway between new and full moon.*

XV. WAVES AND TIDES

The Formation of Waves. The water of the ocean is not only in motion through this system of ocean currents, but it also has two other motions, known as *waves* and *tides*. Waves are formed in any body of standing water, and even on broad, flowing rivers, whenever the wind blows. The wind blowing over the surface of the water causes it to rise and fall, forming crests and troughs which are known as *waves*. (See Fig. 100.)

The water itself moves forward very little, but the wave form travels through the water great distances. As the wave approaches the shore where the water is shallow, there is not enough water to form the broad, low wave of the deep sea, and the wave increases in height and decreases in breadth until finally the top portion falls with a blow on the shore, making breakers or *surf*. (See Fig. 100.)

Tides. Tides are periodic movements of the water that occur over the ocean, in estuaries, and in some lakes. The whole surface of the water rises and falls twice each day in most places, with an interval of twelve hours and twenty-five minutes between high tides. The tides are really great waves, caused by the fact that the sun and the moon, by the power of gravitation, draw the water upward until it is highest on the meridian

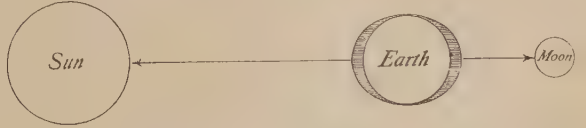

FIG. 105. *Diagram showing formation of tides at full moon.*

nearly under the moon, while another tidal wave is formed at the same time on the opposite side of the earth. (See Fig. 103.) The explanation of this opposite tide is too difficult to be given in this book. As the earth turns to the east and the moon is over a meridian farther and farther to the west, the tide follows as far as it can, first rising on the shore and then receding to form the next tide wave. When the water is rising we call it *flood tide;* when it is flowing seaward we call it *ebb tide.*

FIG. 106. *A small beach in California. The action of the water is slowly wearing away the rocky shore.*

The Cause of Tides. At the time of the new moon, when both the sun and the moon are on the same side of the earth, they are drawing by the force of gravitation in the same line. (See Fig. 103.) At this time the tide is much higher than at those times in the month when the moon is drawing along one line and the sun along another. (See Fig. 104.) At full moon, when the sun is on one side of the earth and the moon on the other, there is also a very high tide. (See Fig. 105.) The tide wave, like a wind wave, moves more slowly as it approaches the shore. Hence the tide wave reaches the shore some hours after the moon has passed that meridian. Sailors need to know when high tide will be, so as to take advantage of it for entering or leaving ports with shallow harbors.

FIG. 107. *A straight, regular, sandy beach, built along a gently sloping shore.*

High and Low Water; Tidal Bores. The difference between high and low water varies in amount in different places. In enclosed seas like the Mediterranean and the Baltic there is practically no tide, while in others there is a change of several feet. The highest tides are found in funnel-shaped inlets like the Bay of Fundy, where they reach a height of more than fifty feet above low-water mark. On gently sloping shores the advancing or retreating tide may extend over a great breadth of surface—perhaps a mile or more. On steep shores very little land is exposed between high tide and low tide.

The tide rushing in and out of the mouths of estuaries prevents the sediment or detritus brought down by the rivers from accumulating there, and helps to keep harbors sufficiently deep for the use of large vessels. In some estuaries the tide advances in a series of great waves so that the time between low and high water is only a few minutes. This phenomenon is known as a *tidal bore,* and is particularly well developed at the mouths of the Seine and the Yangtse-kiang rivers.

Questions and Exercises

(1) What kind of work is done by waves on a rocky shore? On a sandy shore? (2) Tell about the work of waves on a shore you have seen or about which you have read.

(3) Describe a shore at high tide; at low tide: draw a picture of each. (4) How does the rise and fall of the tide affect the ways of the people living on the shore? (5) Make a list of the large tidal estuaries on the east coast of the United States; on the east coast of South America; on the coast of France. Opposite each write the name of a town on that estuary. (6) Would a tide run farther up the Mississippi River or the St. Lawrence? Why?

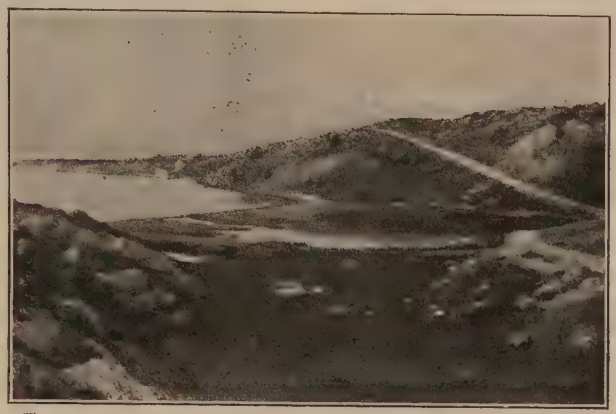

FIG. 108. *A small beach in New Brunswick built up by the accumulated detritus. Note the lagoon behind it.*

XVI. SHORE FORMS

The Deposits Made by Waves and Tides. Waves and tides are constantly wearing away the land and moving the detritus produced by their own work or brought to them by the rivers. In an indented part of the shore line or at the foot of a cliff we usually find accumulations of detritus called *beaches*. (See Figs. 102, 106, and 108.) If the beach is pebbly the pebbles are washed back and forth and banged together until they are worn into sand. The finer detritus is carried into deep water and there deposited, while much of the coarser is swept along the shore and temporarily deposited. The detritus deposited offshore forms shallows in the ocean, or builds up the continental shelves off coasts where continental shelves are found. It is over these shallows that fish are most abundant. The Grand Banks off Newfoundland, the great fishing ground for American vessels, is an excellent illustration of a shallow area on a continental shelf.

FIG. 109. *A hook formed in a river.*

On gently sloping shores, where plains border the water, there is usually a beach which may be many miles in length. (See Fig. 107.) Sometimes on such coasts the waves break at a distance from the shore and an accumulation of detritus is built up, which, when it reaches the surface of the water, forms a continuous offshore beach known as a *barrier beach*. Between the barrier beach and the shore line there is usually a *lagoon* of more or less quiet water into which a river flows. The barrier beach is sometimes broken every few miles by a narrow channel which makes it possible for the lagoon to be used as a harbor.

The materials carried along shore are often built out into the quiet water behind points on the coast, as at the mouth of an estuary, forming a sandy projection of the beach known as a *spit*, if it is built out straight, or a *hook*, if it is curved. Rivers may also form spits and hooks behind a point or behind islands. (See Fig. 109.)

Sea Caves and Promontories. Where the waves break with force at the foot of steep and rocky cliffs, they often wear away little

caves, sometimes called *ovens*. When the cave is cut so deep that the overlying rock falls of its own weight, the cliff is worn back. Caves formed in this way are numerous along the coast of Maine.

The weak rocks bordering a body of water are worn away more rapidly than the strong rocks, and the latter often project as *headlands* or *promontories*. The end of such a promontory is usually called a *cape*. (See Fig. 111.) Capes are also sometimes built of sand where the waves and currents build a sand spit out into the waters.

The Work of Corals. In the warmer regions of the world, as about Florida, there are many islands and reefs built up under the water from the bodies of small animals known as *corals*. The coral animals build a strong skeleton from the food they secure from the ocean water. As they grow upward they die below, leaving the stony coral material as their foundation. They can grow only where the water is warm and continually in motion.

Some of these coral islands, especially in the Pacific Ocean, are more or less ring-shaped, with a quiet body of water or *lagoon* inside. Such a coral island is known as an *atoll*.

FIG. 110. *A ledge, rounded and scratched by a glacier, in Bronx Park, New York City.*

Ancient Shore Forms. Sometimes a great area of land once covered by water is exposed. This may be due to the raising of the land above its former level, or to the settling of the water because of evaporation or drainage. In such a case the land forms which have been made by the deposits from the waters, or by the cutting of the waves, are left as evidences of the former presence of the water. A knowledge of the land forms built by the waves, tides, and currents enables us to explain the history of many regions once covered by water, but from which the water has now disappeared. These old forms are found in many parts of the world, but some of the best examples are about Great Salt Lake in Utah, where the old shores rise in places more than a thousand feet above the level of the lake, showing its former great extent.

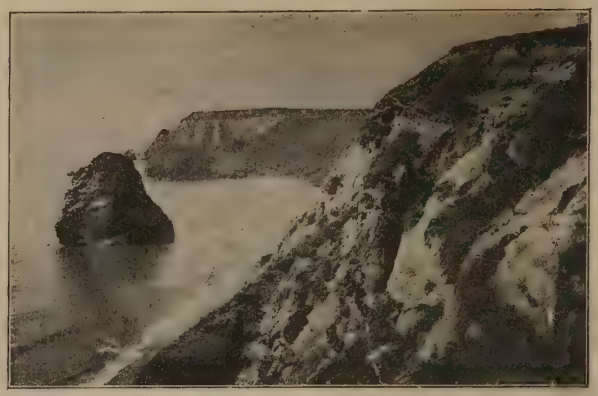

FIG. 111. *The wave-cut shore of Cape Blanco, showing a headland and an island.*

Questions and Exercises

(1) Describe a pebbly beach you have seen. Tell where it was; the size and shape of the pebbles; what wore them away; where the pebbles came from. (2) Draw a picture of a cliff you have seen that was being worn away. Tell where it was. Show, if you can, where the detritus from the cliff was being carried. (3) Make a list of the states in the United States that have barrier beaches. Name a city on such a beach. (4) What is a lagoon? Find one on the map of the United States.

XVII. GLACIERS

What a Glacier Is. A very long time ago the northern parts of North America and Europe were covered by a great mass of ice similar to that now found about the south pole and that covering most of Greenland. These great masses are known as *continental*

glaciers. The work they did in changing the shape of the land is well illustrated by the work now being done by the smaller glaciers occupying the upper portions of river valleys in parts of Switzerland, Alaska, northwestern United States, and certain other regions of the world. (See Figs. 115 and 116.)

The ice of the glaciers is formed by the accumulation of snow which, for many years, has been packed into a solid mass by its own weight, very much as a boy can pack soft, white snow into a hard, bluish snowball.

The Work of Glaciers. Glaciers are not stationary, but move slowly outwards over the land, scraping and scratching as they go. Large rocks are picked up and bodily carried along; small rocks are rubbed together and ground to pieces; while the fragments in the bottom of the ice scrape over the land, leaving scratches in the rocks, which show the direction in which the ice moved. (See Fig. 110.) Regions that have been covered by glaciers have thus lost a large part of the soil that was once formed by the slow weathering of the rocks. The hilltops have been rounded, and the ice as it melted has left the deposits scattered irregularly over the land, particularly in the river valleys. (See Fig. 113.)

FIG. 112. *A drumlin in Massachusetts. Notice the lack of trees and the half football shape.*

Moraines. Where the ice melted at one place for a considerable time, great masses of unsorted detritus of many kinds and of all sizes, from very fine powder or rock flour to boulders as large as a small house, were left, forming an irregular ridge known as a *terminal moraine.* (See Fig. 113.)

A great terminal moraine extends across North America from the island of Nantucket, through Marthas Vineyard and Long Island, across New York Bay, central New Jersey, and northern Pennsylvania, and thence irregularly westward and northwestward to the upper Missouri River. The whole country north of this line, except for a large area in Wisconsin, was once covered by a great glacier. As the ice melted back from this southern position, it left its deposits scattered over the country in the form of many small moraines. (See Fig. 180.)

Drumlins. In some places the glacier deposited long, rounded hills, in shape like half a football, which are known as *drumlins.* (See Fig. 112.) The outlines of these hills are very smooth, and they are usually free from trees. Drumlins are found in great numbers in Massachusetts, in central New York, and in a portion of Wisconsin. The waters made by the melting of the ice also deposited great quantities of sand in many parts of the country. This sand remains in the form of rounded hills or flat plains.

Lakes and Waterfalls Due to Glaciers. In the depressions of the moraines and sand

FIG. 113. *A terminal moraine on Staten Island, with its rolling, irregular surface and rounded hills.*

FIG. 114. *A soil section of a drumlin showing character of detritus and effect of weathering.*

accumulations, many lakes are now found. The river valleys were partly filled by glacial deposits, and when the rivers began to flow again along the lowest lines in the surface of the land, the water filled the many depressions amid the deposits and formed lakes which were later connected by streams. This is the reason for the occurrence of thousands of lakes within the glaciated areas of North America and Europe.

As the rivers flowed they began to deepen their channels, and in so doing in many places cut down to hard rocks lying below a thin accumulation of glacial deposit. At such points *waterfalls* were formed. The waterfalls that have been of such great importance to New England and New York for manufacturing purposes are nearly all the result of the work of glaciers. The value of the waterfalls in the glaciated area of the eastern United States is much increased by the fact that glacial soils readily hold water, so that the streams are not subject to drought during the season of least rainfall.

Soil Formed by Glaciers. The detritus left by the glaciers, as it weathers, forms very rich soil, because it is made up of so many kinds of rock. (See Fig. 114.) In New England, where the glacier moved over very strong rock, thus producing great numbers of boulders, the surface in many places is still so covered with these loose rocks that it can be tilled only with great difficulty. In the central western states, as, for example in Ohio, the glacial detritus contains but few boulders, and is spread so evenly that the surface is a gently sloping plain which can be easily tilled.

Valley Glaciers. *Valley glaciers*, like those of Switzerland and Alaska, also carry deposits scattered along their sides and deposit them in the form of *lateral moraines*. (See Fig. 115.) These glaciers often carry many streaks of glacial deposit down the center of the ice, showing where the lateral moraines of two streams of ice came together. These united lateral moraines are known as *medial moraines*. (See Fig. 116.)

FIG. 115. *A valley glacier in Washington. The lateral moraine deposits are on each side.*

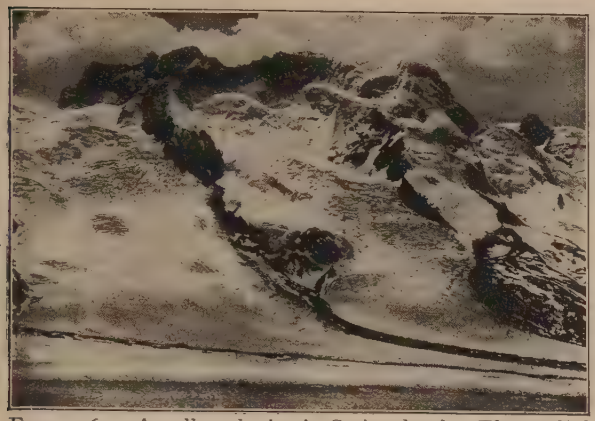

FIG. 116. *A valley glacier in Switzerland. The medial moraine is shown at the junction of the two glaciers.*

Questions and Exercises

(1) Which of the pictures in this chapter shows that the rock has been scraped and scratched by a glacier? (2) Compare a glacier with a river. (3) Where does a glacier deposit detritus? (4) What is a terminal moraine? (5) Trace the terminal moraine of the United States. Name towns north of this moraine in whose vicinity you might expect to find glacial boulders, heaps of detritus, scratched rocks, and rounded hilltops.

(6) Make a list of the states which contain glacial lakes. Locate the largest and most important of these lakes and tell some of their uses. (7) Why should New England and New York be such important manufacturing regions? (8) Find out the names of several leading manufacturing towns in the glaciated area and tell why factories should be located there. (9) Why should Ohio be better fitted for farming than New England?

(10) To what parts of Europe and North America would you go to see a valley glacier? (11) What rivers of Europe are fed by melting glaciers? (12) Which of these rivers flow through lakes? (13) Where in Europe would you look for a terminal moraine? A medial moraine?

(14) Where do Alpine rivers deposit much of the detritus they have brought from the foot of the glaciers? (15) What plain has been built up of such material? (16) Why should such a plain be fertile? (17) Why would you expect such a plain to have a dense population?

(18) Describe the surface of a terminal moraine. (19) Why should stone fences be common in New England? (20) Why are more farms found in the valleys of New England than on the higher lands? (21) Why are drumlins often known locally as "long hills"?

XVIII. DISTRIBUTION OF PLANTS

Where Plants Grow. The land on which we dwell, the water of the ocean, rivers, and lakes, and even the air, furnish homes for enormous numbers of different kinds of plants. Many of these plants are of great importance, as they furnish us the materials for food, clothing, and shelter, or because they serve as food for animals.

Land plants thrive best where the soil, temperature, and moisture are best suited to furnishing them the food necessary for their growth. The character of the climate determines the length of the growing season; and the length of the growing season determines the distribution of the various species of plants over the world; for some plants grow in a few weeks, while others require many months. We therefore find plants varying widely in their character from the polar regions toward the Hot Belt. Plants grow most luxuriantly where the soil is fine and rich, as it is in the great alluvial plains of our

FIG. 117. *A dense forest growth in Washington.*

largest rivers, and where the moisture is abundant.

Vegetation Regions. We may distinguish three great kinds of vegetation regions: *Forests*, in which the trees grow high above the grasses and shrubs and other forms of plant life (see Fig. 117); *grasslands*, where trees are practically absent, except perhaps along the rivers, but where grass abounds (see Fig. 118), and *deserts*, in which plant life is very scarce, except the prickly forms like our cacti (see Fig. 126).

The most luxuriant forests are the tropical forests found in the Hot Belt. Between the Hot Belt and the Temperate Belt, where the rainy season comes only once a year, we find much open grassland, known as *savannas*. (See Fig. 119.) The well-watered portions of the temperate region have extensive forests, the drier parts are deserts, while between the desert and the forest areas are the temperate grasslands, or *steppes*. (See Fig. 119.) In the North Cold Cap, where the growing season is short, there is an extensive boggy area known as the *tundra*, in which grasses and mosses grow in abundance. (See Fig. 119.) The coldest polar regions consist of barren, icy deserts where few plants grow.

FIG. 118. *A temperate grassland with scattered groups of trees.*

Vegetation and Altitude. As the climate changes in ascending a mountain or a high plateau, so the vegetation changes at various altitudes, even in the Hot Belt. We may find the plants of several different vegetation regions on any high mountain, while the top of the mountain may be snow-capped and an ice desert the year round. Thus mountains may form little plant islands, banded from foot to summit with widely different forms of vegetation, and rising in the midst of a great region whose vegetation is all like that found at the base of the mountain.

Vegetation and Slopes. Winds are the great carriers of moisture, and since it is moisture that determines the difference between a desert, a grassland, and a forest, anything that causes the winds to lose their moisture greatly affects vegetation. The distribution of mountains as related to wind systems is, therefore, very important. The windward side of mountain ranges receiving the moisture-laden breezes from the oceans is usually forested. The leeward side, being dry, may be as barren as a desert. Lowlands, with their gentle slopes, usually contain great numbers of lakes, bogs, or swamps if situated in the moist regions of the world.

In a hill country the gentler slopes are usually devoted to crops and grass fields, while the steeper slopes are given over to forests and to grass for the pasturage of cattle. Steep slopes do not hold soil as easily as gentle slopes. Crops planted on hillsides are therefore liable to be washed out during a heavy rain. It is best to have hillsides devoted to vegetation that covers the ground closely like grass or trees. Thus we see that the form of the land has an important effect upon the distribution of vegetation.

Tropical Forests. The tropical forests are the regions of the densest vegetation in the

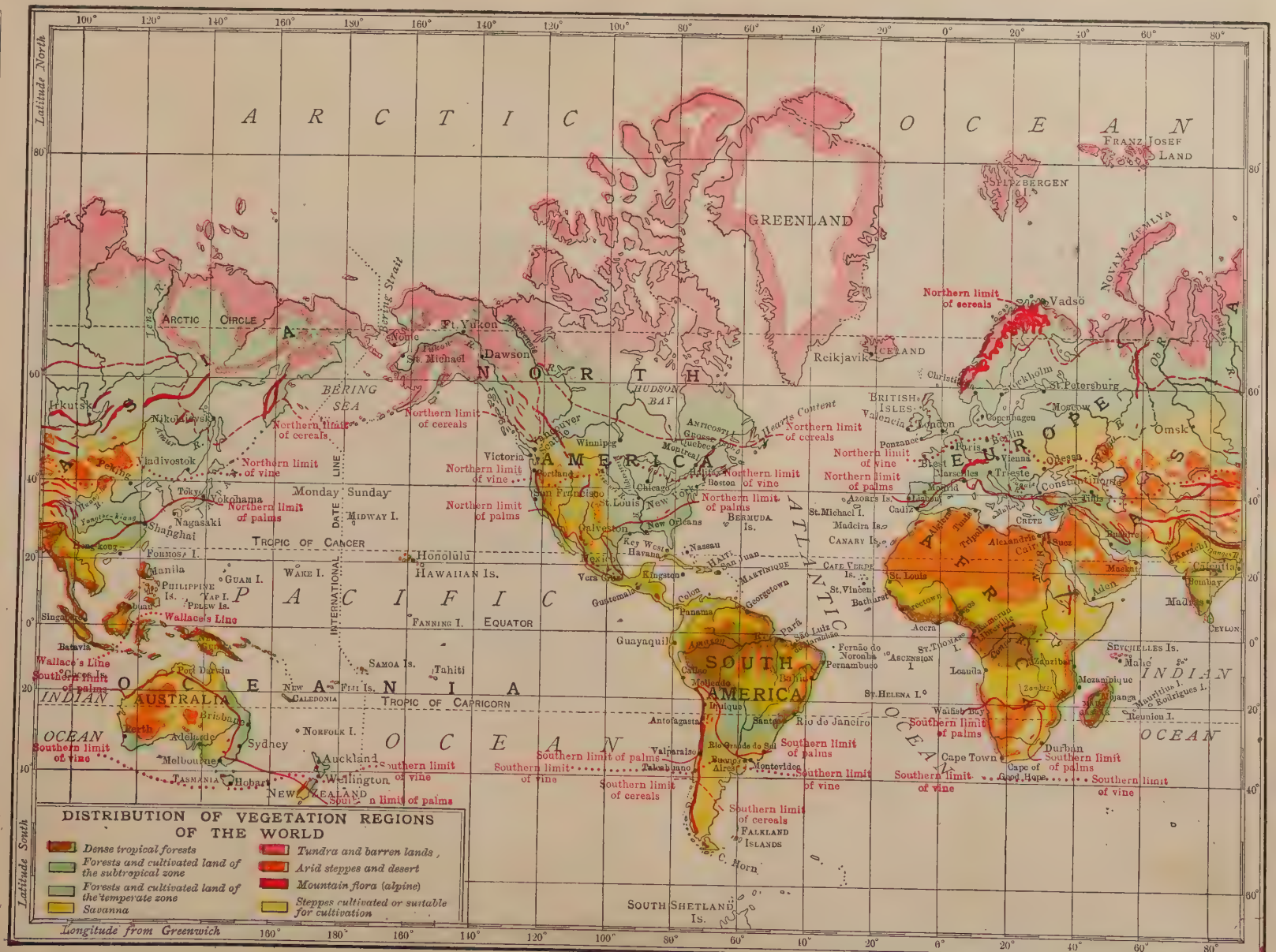

FIG. 119.

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world. As they lie near the Heat Equator with its almost daily rains, they have abundant moisture. The warmth is great and the sunshine ample, for the sun shines nearly twelve hours every day in the year. The conditions are so favorable that the vegetation is almost inconceivably dense, producing what are known as *tropical jungles*.

FIG. 120. *Tropical palm, showing the peculiar trunk growth.*

In addition to the trees, which may grow to a great height, the ground is covered with grasses and bushes, and over the trees and around their trunks twine creepers and the roots of plants that take their food from the air. As a result, the foliage is in places so dense that the forest is dark and gloomy. The greatest tropical forests are those of the Amazon and the Congo, and those of the East Indies.

The forms of vegetation growing in these forests are for the most part unfamiliar to those who live in the northern part of the United States unless they have been seen in greenhouses. They include many trees like the banana, plantain, bread-fruit, and cocoanut palm, which furnish food to the native peoples, and whose products we are daily using in increasing quantity. (See Fig. 120.) The rubber tree of the tropical forests furnishes us crude rubber. The best dyewoods and most valuable cabinet woods come from these regions, as do also common spices, such as cloves, nutmeg, cinnamon, ginger, and pepper. The East Indies particularly produce an enormous quantity of bamboo, a giant grass rising to a height of sixty or seventy feet, and used in various ways the world over, especially in the manufacture of furniture.

Savannas. The regions near the northern and southern tropics, as we have seen, have but one rainy season a year. At that time all vegetation bursts forth and grows abundantly for a few weeks, and the whole region is covered with green grass and blooming

FIG. 121. *A rhododendron thicket in North Carolina.*

flowers. When the rain stops, everything dries up and turns brown and gray; grass cures on the stalk and furnishes food for cattle. The temperature here is never below sixty degrees, and the rainfall ranges from ten to forty inches a year.

These grassy regions, which are known as *savannas* in many parts of the world, are found in Central America, in the valley of the Orinoco (where they are known as *llanos*), south of the wet jungles of the Amazon (where they are called *campos*), just north and south of the wet jungles of Africa, in southeastern Asia, and in northern Australia. (See Fig. 119.)

FIG. 122. *Palmetto trees in a subtropical forest.*

Temperate Forests. The most progressive nations as well as the densest population of the world lie in the belt of *temperate forests*. In the Northern Hemisphere this belt includes many kinds of trees; in the northern portion mostly evergreens, and in the southern portion largely deciduous trees which shed their leaves annually. The southern portion of this region, which borders on the tropics, is sometimes called the subtropical forest, because most of its trees cannot live where the temperature is even cool. (See Figs. 121, 122, 123, and 124.)

The people of the eastern part of the United States live in the region of temperate forests, though the forests have largely disappeared. This is clear when we remember that trees practically covered the ground before white men came to America, and that, if the region is not cultivated for a year or two, it at once begins to grow up to trees. The region of temperate forests has abundant rains, well distributed through the year, and in those parts where the sunshine and the rainfall are both abundant, as they are in the southern portions of the belt, we find both deciduous and evergreen trees.

We shall learn more concerning the valuable plant products of this region as we study about our own country and the continent of Eurasia. Owing to the great variety of plant life that grows in the temperate forest region, the people can carry on almost every possible occupation. Agriculture, grazing, and lumbering depend entirely, of course, upon the distribution and kind of plants. Owing to the variety of natural riches and because of the healthful

FIG. 123. *A Spanish oak with its hanging moss.*

FIG. 124. *Pine growth in a temperate forest region.*

climate, the temperate forest region produces a large portion of the food products of the world.

Arid Deserts; Oases. In the interior of the continents and on the leeward side of the great mountain ranges, particularly in the westerly wind area and in the trade-wind belts where the wind blows constantly over the land, or has lost its moisture on a mountain barrier, we have regions of arid desert, where but little vegetation grows except on the higher mountains. The arid deserts, therefore, have few resources, and are mostly occupied by wandering people, dependent upon the flocks which they drive from place to place in search of food.

Where vegetation exists in the desert, it is usually in the form of spiny or fleshy cacti or similar plants, although there are some shrubs and bushes. (See Figs. 125 and 126.) In the few places where water comes to the surface, forming natural camping grounds for people moving through the desert, and furnishing water for the soil, we have small garden spots known as *oases*. The oases within the desert, Sahara, are so important that they are better known than many large towns in more densely inhabited regions. (See Fig. 481.) The arid and the cold deserts are the most thinly populated regions in the world.

FIG. 125. *Desert vegetation.*

Steppes. In the Temperate Belts, lying between the temperate forests on one side and the arid deserts on the other, are regions of semi-arid country in which the rainfall is between ten and twenty inches. These regions, or *steppes*, are natural grasslands and great grazing countries. (See Fig. 128.) The population is rather thinly scattered, but with the increased use of irrigation, by means of which water is secured for agriculture, grazing is gradually giving place to agriculture.

A large part of our western plains is a steppe region, but the great steppe land of the world is east, west, and north of the Caspian Sea

FIG. 126. *Characteristic spiny cacti from an arid desert.*

in Eurasia. Steppes also extend over a considerable portion of South America, South Africa, and eastern Australia, in all of which regions grazing is an important industry.

Tundras and Ice Deserts. As we go toward the poles from the temperate regions the vegetation becomes dwarfed and the trees fewer. Finally trees and bushes are left behind, and we come to a region in which only berries, mosses, and quick-blooming plants grow in a thin surface layer of soil from which the frost has melted and which will support vegetation for only a few weeks in the short summer. This region is known as the *tundra*. It is largely occupied by wild animals and by hunting tribes who live in the edge of the temperate forests or on the seashore in winter, and hunt in the forests in summer. The people wander from place to place and live in homes that can be easily moved.

FIG. 127. *A view of the Nile and the Pyramids.*

In the Northern Hemisphere, north of the tundra and on the border of the frozen deserts, dwell the Eskimos, who live entirely upon animal food, gained chiefly from the ocean. In the vast ice fields of the frozen desert about the north and south poles no people can live. These regions are the great unexplored areas of the world.

FIG. 128. *Grazing on the steppes of the western United States.*

Questions and Exercises

(1) Make a list of the tropical forest trees that you have seen or would recognize from a picture. (2) Draw a picture of one you have seen. (3) On an outline map of the world color with blue the tropical forest region. Write the name of a town in each continent in this region, and beside it write in figures the amount of yearly rainfall of this town with its January and July temperature. (4) What are the chief products of this forest region?

(5) Make a list of the trees of the temperate region that you know, and mark with a cross those that grow about your home. (6) Are deciduous trees or conifers most abundant?

(7) On an outline map of the world locate the chief grasslands. (8) In which continent are the grasslands called steppes? Plains? Campos? Llanos?

(9) On the same outline map color in deep yellow the arid deserts of the world, and in light yellow the tundra regions. (10) Write in your map the names of the chief animals of the tundra region and draw a line under those which are useful to man. (11) What do you know of individuals who have penetrated the ice deserts? How have they managed to live there? (12) Draw a picture of a plant island in the Hot Belt. (13) If you have climbed a high mountain describe the change in vegetation from the base to the summit. (14) How can you account for this change? (15) Had this mountain been glaciated or not? (16) How do you know? If you live in a hilly region describe the vegetation on the hills and compare it with that of the valleys. (17) Why does the grass grow green more quickly in spring near streams?

FIG. 129. *The distribution of wild animals by regions.*

XIX. DISTRIBUTION OF ANIMALS

The Dependence of Animals upon Plants. The distribution of animals over the world is closely related to the distribution of plants, for all animals depend directly or indirectly upon plants for their food. Animals, however, can move about in search of food, and therefore are not so likely to die as are plants if the food or water supply fails because of a bad season. Great numbers of animals live solely upon plants. We call such animals *herbivorous*. Others, like the great cat family, which includes the lion and the tiger, live upon other animals, and are called *carnivorous*. (See Figs. 143 and 148.) But as the victims that furnish them food depend upon grass and vegetation for their sustenance, plants are of importance to them also. Other animals, including man, eat both plant and animal food.

FIG. 130. *A group of moose.*

FIG. 131. *A fallow deer.*

Animals also need shelter and a certain degree of warmth. Some animals, like seals and certain birds, have a very wide distribution, moving from place to place with the season so as to secure food and comfort. Others live only where the particular food which they need is found.

FIG. 132. *The white polar bear from the Arctic regions.*

FIG. 134. *The large Kodiak bear of Alaska.*

FIG. 133. *The coyote of the western United States.*

The animals of the land are numerous and of many kinds, but include only a part of the living creatures of the world. Living creatures abound in the ocean also; some swim freely from place to place, remaining usually in waters of a certain temperature, however; others, like oysters and clams, and the corals of which we have spoken, live on the bottom of the ocean in its shallower parts, and are dependent upon the waters that move by them for their food.

Relation of Animal Characteristics to Regions. We may study the distribution of animals as we have done that of plants, according to whether they live in the deserts, the grasslands, or the forests. In the grasslands the larger animals include our common cattle, buffaloes, which formerly lived in such great numbers in North America, and the many forms of deer and antelope. (See Figs. 130, 131, and 135.)

In the tropical forests we find apes, bats, and many of the animals that live almost entirely on nuts and fruits. In the outskirts of the forests and the grasslands are found the carnivorous animals which prey on the animals of both these regions. They are often the color of the grass in which they live.

The animals of the desert are nearly all a grayish brown, being similar in color to the desert region itself. Of these the coyotes of our western plains and the prairie dogs of the same region are good illustrations. (See Fig. 133.)

In the steppe region, where the land is brown during the dry season which prevails the larger part of the year, the animals are a brighter brown. In the tropical forests many of the insects and birds are green like the region in which they live. The green parrots, sometimes

FIG. 135. *A group of buffaloes.*

FIG. 136. *A chamois.*

kept as pets, and the many-colored humming birds of South America are tropical forest-dwellers.

The Arctic animals, like the polar bear, are white like the region in which they live. (See Fig. 132.) Other polar animals, like the Arctic fox and the bird known as the ptarmigan, are white in winter but change their color in summer when the snow has disappeared for a short time.

Animal Regions and Resemblances. It has been found better, however, to consider the distribution of animals in

FIG. 137. *A group of elk.*

accordance with their general resemblances. All of North America north of Central America, all of Eurasia north of the Himálayas, and Africa north of the desert, Sahara, have many animals which are alike. These are the bear, the elk, the reindeer, the fox, the wolf, and many others. This area, which is sometimes grouped as one *animal region*, includes the greater portion of the land of the world. (See Fig. 129.)

In the extreme north where the lands of the Eastern and Western Hemispheres lie near together, the animals are very much alike. Toward the south the lands are more separated in the two hemispheres and the animals vary more widely.

North American and Eurasian Regions. Northern North America, however, has so many animals that are different from those

FIG. 138. *Wild Canada geese.*

FIG. 139. *Wild turkeys.*

of northern Europe and Asia that it is usually considered as a region by itself, which we may call the *North American Region*. Among the animals which are found only in this district are the musk ox, the skunk, the prairie dog, the wild turkey, and the raccoon. (See Figs. 134, 138, 139, and 140.)

Among the animals which were once found only in the northern parts of the Old World, which we may call the *Eurasian Region*, are the mole, living in the ground, the rat, sheep, goat, and camel. Many of these forms have been brought to America by the white people and are now widely scattered throughout the Western Hemisphere.

FIG. 140. *A musk ox.*

South American Region. In Central and South America there are many forms of animals found nowhere else in the world. The true monkeys, with their long tails which they use in climbing; the ant-eaters; the armor-covered armadillos; the largest flying bird in the world, the condor; many humming birds; and the great ostrich-like bird known as the rhea, are distinctive of this region, which is known as the *South American Region.* (See Figs. 142 and 350.)

FIG. 141. *Alligators of the southern United States.*

FIG. 142. *The condor, the largest flying bird in the world.*

The puma and the jaguar, both great cat-like animals, extend into North America, and the tapir is found both in South America and in southeastern Asia.

Ethiopian Region. South of the desert, Sahara, which is so barren and dry that animals cannot readily migrate across it, is the vast area known as the *Ethiopian Region;* this contains many animals not found elsewhere. The great hippopotamus, living in the rivers and swamps of the hot regions of Africa; the long-necked giraffe; the striped, horse-like zebras and the smaller quaggas; the ostrich, the largest walking bird in the world; the great man-like gorilla, and the chimpanzee, live in this region only. Here also are found great numbers of antelopes. (See Figs. 144, 145, 146, and 147.)

FIG. 143. *An African lioness.*

Many animals of the Ethiopian Region are also common in southeastern Asia. Among others that might be mentioned as common to both regions are the lion, the leopard, the panther, the hyena, the elephant, and the rhinoceros, which are frequently seen in our circuses and zoölogical parks.

FIG. 144. *The chimpanzee.*

Oriental Region. In southeastern Asia, which lies in the Hot Belt and therefore has an abundance of rainfall and vegetation, we find a great number of carnivorous animals, including those already mentioned, and also the tiger, which is native to this region only, but which sometimes ranges far north over Asia nearly to the Arctic Circle. The animals of this district, which is known as the *Oriental Region,* are kept from migrating into the Eurasian Region to the north by the great mountain barrier of the Himálayas and the other mountains which lie to the north and west.

FIG. 145. *The striped, horse-like zebras.*

Australian Region. The islands close to Asia, including Sumatra, Borneo, and the Philippines, have animals similar to those of the Oriental Region. Across a narrow channel of deep water which separates these islands from those of the north coast of Australia is the *Australian Region*, in which the animals are entirely different from any we have mentioned. In fact, the difference is so great that this line of separation is known as *Wallace's Line*, named for the eminent scientist, Alfred Russell Wallace, who first showed the reason for the great difference between the animals of the Oriental Region and the Australian Region.

FIG. 146. *The double-horned rhinoceros.*

FIG. 147. *The hippopotamus.*

FIG. 148. *The tiger.*

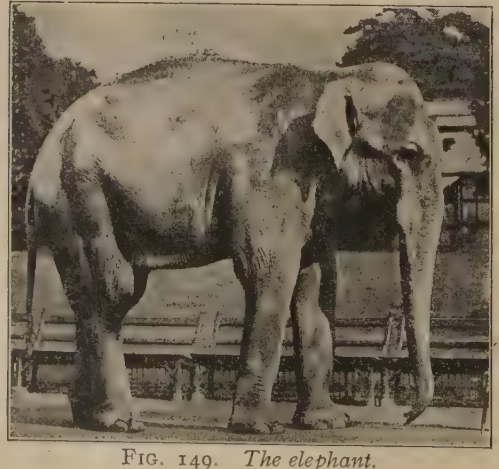


FIG. 149. *The elephant.*

In the Australian Region we find no animals like those of any other part of the world except the domesticated forms like horses, dogs, sheep, cattle, and rabbits, which have been carried there by white men. The most interesting perhaps are the mammals, which suckle their young. The mammals of Australia differ from nearly all others because they carry their young in a pouch of skin in the underside of the body. The largest of these pouched animals, or *marsupials*, are the kangaroos, which can leap rapidly by using their strong hind legs and great tails. (See Fig. 151.)

Here also we find animals which are mammals, yet lay eggs, like the duck mole. The birds also are peculiar. The largest are the cassowary (see Fig. 152) and the emu, both somewhat like an ostrich. Many of the birds are beautiful, like the bower bird which builds a nest of bright-colored objects, the brilliantly colored cockatoo, and the lyre bird, whose great tail gives it its name.

Domestic Animals. Among the animals which are most broadly distributed over the world are those which have been domesticated or made useful by man, which can live in various climates and whose food man supplies, if it cannot be secured by the animals themselves the year round. (See Fig. 150.)

The house dog is found wherever people live. As it requires but little care and readily becomes a friend to man, it has followed him in his wanderings more than any other animal. In extremely cold countries, where vegetation is lacking, dogs are much used for drawing loads, because the necessary animal food can be readily carried, when it would be impossible to transport enough plant food for horses.

FIG. 150. *The distribution of our common domestic animals.*

The house cat, another very widely distributed animal, is found almost universally in those regions occupied by the white peoples, but less among savage or primitive peoples, because it cannot be domesticated as easily as the dog. In North America it appears nearly everywhere south of Hudson Bay, and through Central America. It is found around the coast of South America, and extends farthest inland in the Argentine Republic. The cat is also distributed throughout the larger part of Europe and Asia, except in northern Asia, in the occupied region of Australia, and along the east and west coasts of Africa south of the deserts. It is found in few islands of the Pacific except in the Hawaiian group, which is occupied by white people.

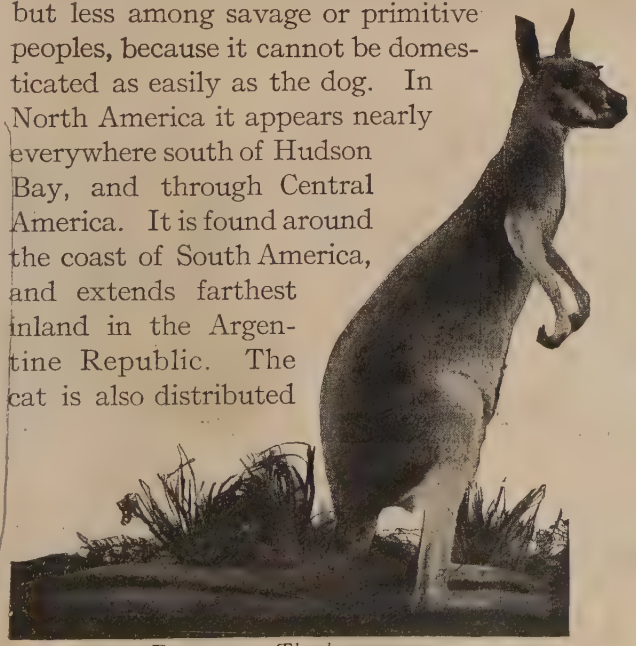


FIG. 151. *The kangaroo.*

The horse lives all over the world except in the tundras and cold deserts, in a part of Australia, and in the equatorial jungles of Africa and South America. Sheep and cattle are distributed over the world wherever they have proved an advantage to men, and where food can be readily secured for them.

FIG. 152. *The cassowary.*

Horses, sheep, cattle, and hogs are the most important of the domestic animals, because the

FIG. 153. *The orang-outang.*

horse is the great draft animal of the world, and the others are the chief food-producing animals. Sheep are also important for their wool, and cattle for their skins.

The camel is the most useful domestic animal in the deserts of southwestern Asia and northern Africa. Its feet are so shaped that they do not sink into the sand, and it can go long distances without food or water. Hence the camel is used almost everywhere in the hot, dry desert, both for traveling and for transporting goods.

FIG. 154. *Camels used for traveling in deserts.*

Questions and Exercises

(1) Make a list of the animals that live in the desert region. (2) Choose one and describe its appearance and habits. (3) Do the same for the tropical forest region, the tundra region, and the grasslands.

(4) What advantage is it to animals of any region to be similar in color to their surroundings? Give illustrations of this from the different vegetation regions.

(5) Name any plants or animals that are new at home in North America which have been brought from other continents. (6) Make a list of animals peculiar to South America and mark with a cross those whose pictures you find on these pages. (7) Do the same for the Ethiopian region. (8) Name the countries in which you can find in its native home the condor; the camel; the giraffe; the armadillo; the gorilla; the emu; the boa-constrictor.

(9) Locate Wallace's Line. (10) Why has this line been drawn? (11) Describe one of the Australian animals. (12) Why cannot animals readily migrate over mountains or across deserts? (13) Why are the animals of the North American and Eurasian regions so closely similar?

XX. THE PEOPLE OF THE WORLD

The Distribution of Mankind. We do not know exactly how many people there are in the world, but the number is estimated at nearly 1,600,000,000. Mankind is distributed very unevenly. The regions of permanent ice on the mountains and about the poles are uninhabited. Deserts contain very few people, except around the oases, and the hot, moist jungles also are practically uninhabited.

The largest numbers of people are found in the lowlands near the seashore, where the climate is not too severe for outdoor labor the year round, and where there is sufficient moisture to raise the crops necessary for food. The most densely inhabited region of the world, outside of certain small areas in some of the largest cities, is in the low plains of southeastern Asia. (See Fig. 169.)

The most progressive nations live in the coastal portions of the Temperate Belts where the summers are not too hot and the winters not too cold, and yet where there is enough contrast between summer and winter to make it healthful. In the occupied regions of the Hot Belt the people are not so energetic and advanced as they are in the cooler Temperate Belts. White people cannot live

FIG. 155. *A schoolmaster in India, a dark-skinned Caucasian.*

permanently in many tropical regions except where the altitude is sufficiently high to give a cooler and drier climate than is found in the lowlands.

The White Race. The largest number of people belong to the *Caucasian* or *White Race*. The members of this race have oval faces, small mouths and lips, large, narrow noses, and straight eyes. They are the most active, enterprising, and imaginative race of the world; they speak many languages and are divided into many nations. Some people of the Caucasian race are very dark-colored, so that really two great groups of white people exist, the dark-skinned and the light-skinned. The light-skinned live in the cooler portions of the temperate belts, while the dark-skinned occupy the warmer parts of this belt and the subtropical regions. (See Fig. 155.)

FIG. 156. *Italian children, dark-skinned Caucasians.*

In earlier times the white race lived only in the Eastern Hemisphere. From there they have emigrated in search of new homes or better opportunities for living, until now they are found in all regions where the climate is favorable for progress. They are found in great numbers throughout the larger part of North America, Europe, South America, and in the coastal regions of Australia, and are increasing in the tropics.

Fig. 157. *Children of Burma who belong to the Brown Race.*

The Yellow Race. The next largest number of people is found in the *Yellow Race*, which occupies almost all of Asia, and northern Europe. This race is sometimes called the *Mongolian Race*, named for Mongolia in China. One branch of this race, inhabiting southeastern Asia, is sometimes called the *Brown Race*, because of its deeper color. The people of the yellow race are shorter than those of the white race, and have coarse, black hair, small noses, and small black eyes, with the outer corners a little elevated. As a rule they are not progressive and include some of the most backward tribes of the world. The Japanese, Chinese, Eskimos, and Laplanders all belong to the yellow race. The Japanese are the most progressive and enterprising of this race. (See Figs. 157, 158, and 159.)

The Red Race. The third great race is the *American* or *Red Race*, sometimes considered as belonging to the Yellow Race. The Red Race is found only in America, and it includes all the native peoples of the Western Hemisphere except the Eskimos. By native, we mean the peoples who do not, by birth or descent, belong to the Eastern Continents. The people of the red race have a yellowish, copper-colored skin, long, coarse, black hair, small round eyes,

and are about the height of the white race. Most of the red race are but little civilized, although a few are just beginning to develop industries which will furnish products of value to the rest of the world. The Indians do not readily show their true nature to strangers and hence are little understood. Usually considered a sullen and cruel people, this reputation is often far from just. (See Figs. 160 and 162.)

The Black Race. The fourth and last group of people is the *Black* or *Negro Race*. Their native home is in the tropical region of Africa, in Australia and the neighboring islands. Negroes were formerly brought to America as slaves, and now are found in the warmer portions of North and South America in great numbers. (See Fig. 163.)

The Negroes that we know in this country have a dark brown or black skin, short, black, kinky hair, very broad, flat noses, large round eyes, large teeth, and thick lips, and are about the same height as white people. As a race they are somewhat indolent, like other peoples whose homes are in tropical countries; they are often impulsive in their actions, but are faithful and affectionate to any one for whom they care.

FIG. 158. *A Japanese girl.*

In central Africa, in certain parts of southern Africa, and in a few of the islands of the world are the Negritos, who are like the Negroes in many ways, but much shorter; some of them are not more than four feet in height. These people are not found anywhere except in their native homes. The natives of Australia belonging to the Negro Race are the lowest and most uncivilized people of the world. They live almost entirely on the food to be obtained from the animals and the plants about them, and they furnish few products of value to the rest of the world, except those which they can gather from the forests or animals without much labor.

Questions and Exercises

(1) On an outline map of the world, mark in dark brown the most densely populated regions. (2) What countries are they in? (3) Locate a town in each region, and write on the map the name of the race found in the greatest numbers in this town.

(4) Make a list of the countries inhabited by the Caucasian Race; the Mongolian Race; the Negroes.

XXI. THE PEOPLE OF THE WORLD (Continued)

Savage People. Everywhere people must secure food, clothing, and shelter in some way, but the manner of procuring these necessaries differs among different races, and even among different divisions of the same race.

The lowliest people are those who get their living entirely by hunting and fishing, or by digging edible roots, or gathering the fruit of plants that grow about them. These people we call *savage*. There is no division of labor among them, every man seeking the necessaries of life for his family without help. Usually, however, the men are the hunters, while the women gather the roots and carry the burdens on a march. Their homes are extremely simple, and many have no fixed abode, moving about over the country as they wish, and setting up a hut or shelter wherever they go.

These hunting and fishing races are found only in small numbers in a place because they

need a large area to furnish the necessary food for a few people. In the colder regions they dress in skins, but in the warmer regions they wear few clothes. Their implements are simple, and consist chiefly of cooking utensils, spears, clubs, and other hunting implements. Some of them do not even have the simple bow and arrow, so well known among our western Indians.

FIG. 159. *Tunguses of Siberia.*

Barbarous People. Those people who carry on grazing or primitive agriculture, that is, who raise crops from the soil or follow flocks and herds about the country, are called barbarians, and are more advanced than savages. (See Figs. 159 and 165.) People who live by their herds and wander from place to place are called *nomads*.

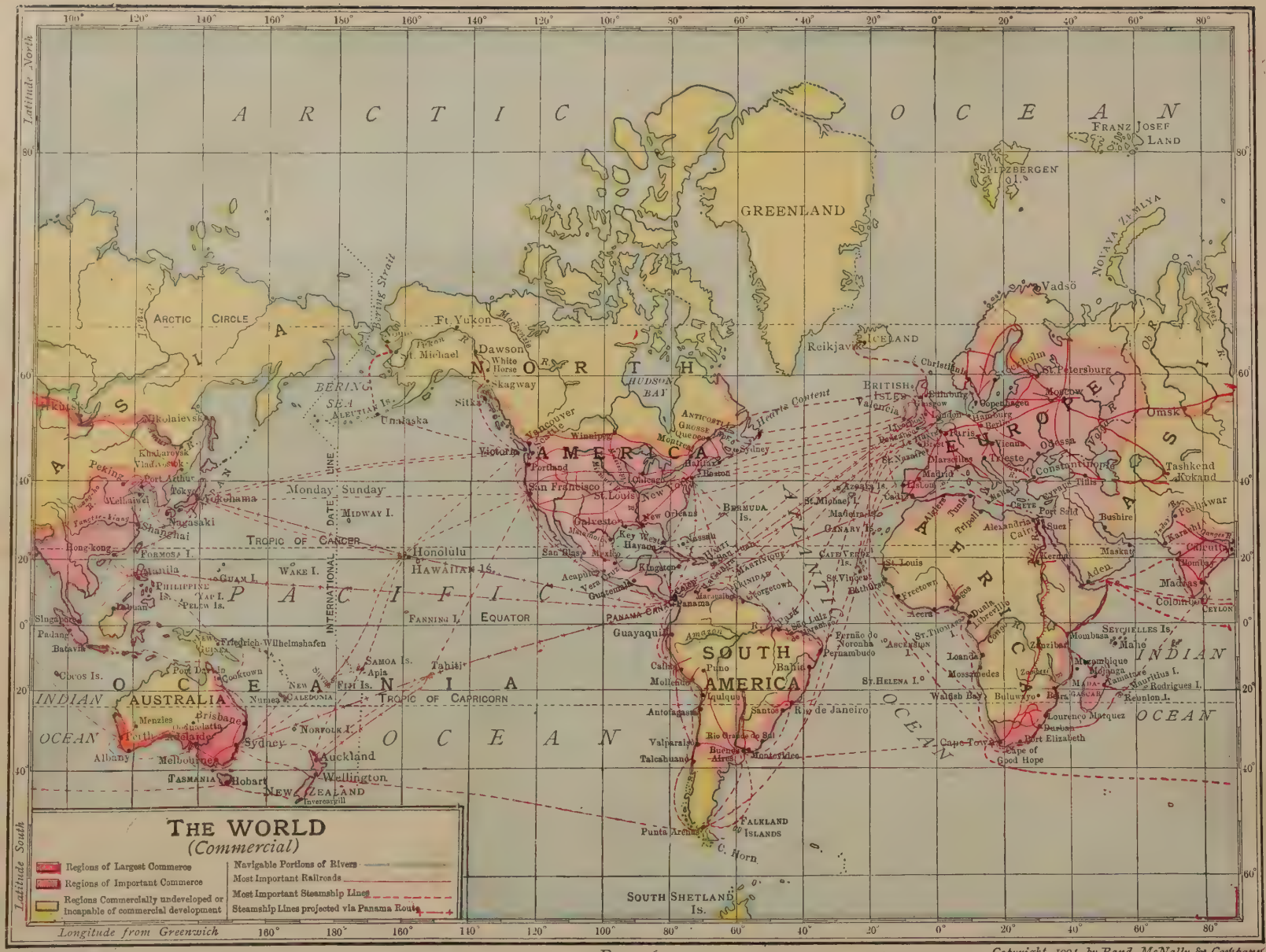
Some nomadic peoples, like the Arabs of Asia and Africa, live in villages, each of which is made up of a few families. These people carry on agriculture in a simple way and have developed certain industries and made tools to help them in their work. Even among these people, however, there is little division of occupation, except between the men and the women. Each family or tribe secures for itself all that it needs for sustaining life.

FIG. 160. *Indian children of North America with their decorated dress.*

Civilized People. The highest group is that known as *civilized*. Among civilized people many varied industries are followed, and, as a rule, each worker devotes his attention to some one particular thing, with a view to exchanging or trading the product he cannot use for other things which he needs or desires, and which other people, for some reason, can produce better than he can.

The Industries of Civilized People. The larger number of the civilized people of the world live in the country. They are engaged chiefly in agriculture, grazing, mining, or lumbering, occupations which cannot be carried on in densely populated regions. These people live mostly in permanent homes, although in grazing and, to some extent, in lumbering, the men have to leave their homes for many months in the year. They make use of many inventions and tools unknown to the barbarous and savage peoples. They devote greater attention to their home life, to the education of their children, and to the development of new industries and of commerce. They also build cities and towns, because they have found it advantageous to live in as large groups as possible.

The products secured from the earth through the industries mentioned furnish the materials which are manufactured or



Revised, 1910

FIG. 161.

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changed in some way before they can be used. We find, therefore, many thickly settled areas in which manufacturing and trading are the leading occupations of the people. Groups of people gathered together for these purposes in one place form a town or city. It is in the towns and cities that we find the greatest business activity and the greatest use of modern conveniences and luxuries. Every occupation except mining, lumbering, and hunting can be illustrated in a large city like New York.

FIG. 162. *Moki Indian girls of Arizona.*

The people who are confined in factories or business houses do not have the freedom of life that people living in the country enjoy, and in many respects their life is less pleasant and healthful.

Commerce and Trade. The people engaged in the different industries mentioned are all producing articles for use or exchange. The buying and selling and transporting of goods from one part of the world to another is known as *commerce* or *trade*.

FIG. 163. *Australian negro children.*

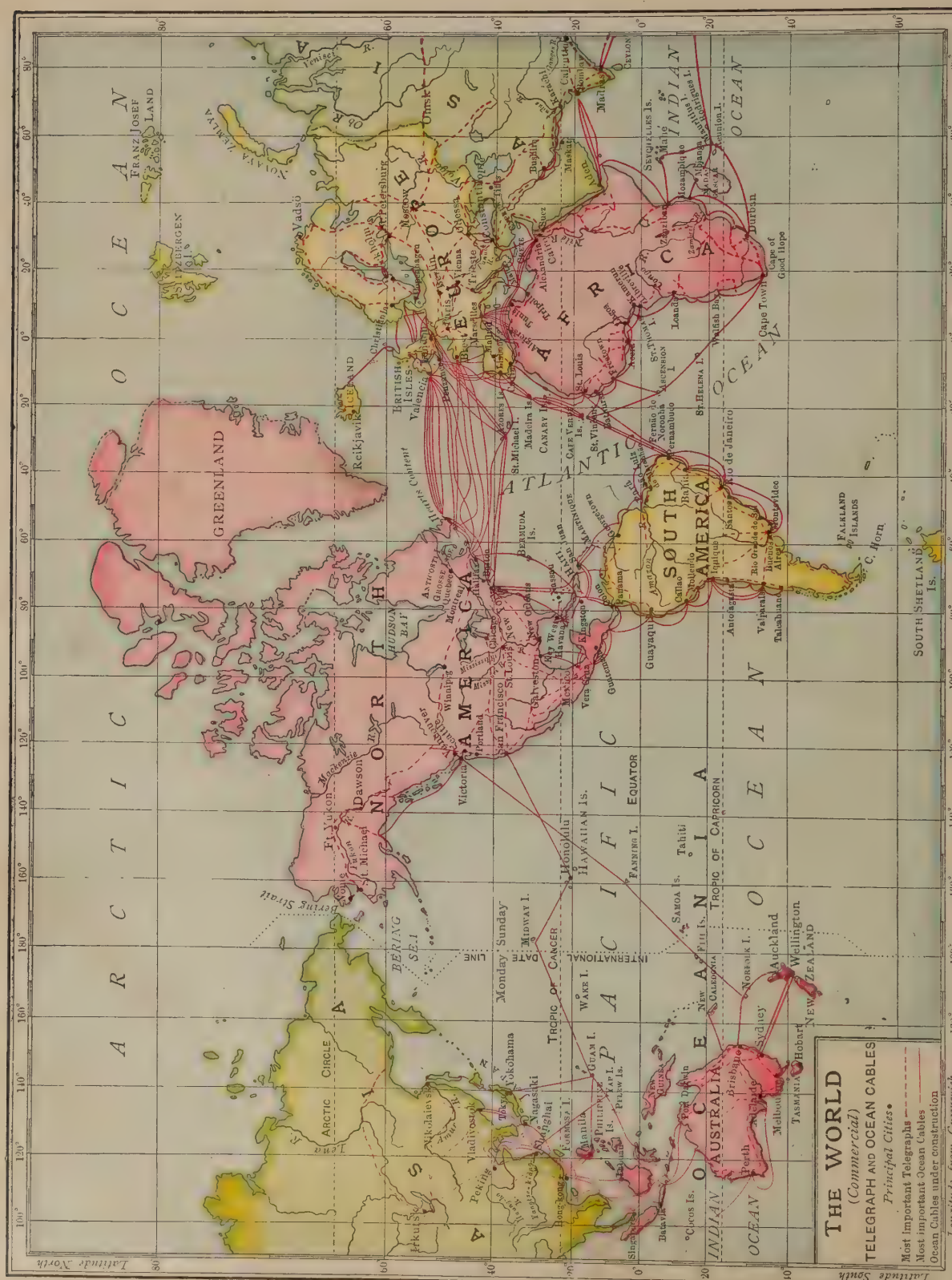
The simplest form of commerce is the exchange of one article directly for another, which is known as *barter*. This is seen sometimes in small country towns where the farmer takes his products to the store and exchanges them for the goods he desires. Years ago the miner *bartered* when he took to the trading store the nugget of gold he had dug from the earth. A hunter or trapper often brings in skins to exchange for food and other things he needs.

In most commerce, however, *money* is used. Money is usually made from some valuable metal that will not readily wear out, and that can be exchanged for anything else. In commerce, therefore, a man exchanges the products he has to sell for money, such as bank checks or drafts, and then buys other things at his convenience.

Transportation. In early times local commerce on land was carried on almost entirely by means of caravans of camels or horses. (See Figs. 154 and 166.) The cost of transportation was so great that, of course, only the richest and the most valuable products could be transported in this way. People living close to a great sea like the Mediterranean early learned navigation and thus oceanic commerce developed.

A large part of the trade of the world is now carried on over the oceans. (See Fig. 161.) Formerly large bodies of water were a hindrance to commerce because they interrupted land transportation. Now in many places the land is a hindrance to commerce, because it interrupts water transportation, which for long distances is much cheaper than transportation by land.

To overcome land obstructions and to


THE WORLD
(Commercial)
TELEGRAPH AND OCEAN CABLES
Principal Cities.
Most important Telegraphs
Most important Ocean Cables
Ocean Cables under construction
Longitude from Greenwich
Latitude North
Latitude South
ARCTIC OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN
GREENLAND
NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AUSTRALIA
AFRICA
Reykjavik
Dawson
Victoria
San Francisco
St. Louis
Montreal
Boston
New York
Washington
Chicago
Winnipeg
Vera Cruz
Guayaquil
Callao
Valparaiso
Buenos Aires
Rio de Janeiro
Pernambuco
Bahia
Montevideo
Falkland Islands
C. Horn
South Shetland Is.
Bermuda Is.
Bahama
Jamaica
Azores
Madeira Is.
Canary Is.
Cape Verde Is.
St. Michael I.
St. Helena I.
Ascension I.
Cape Town
Durban
Mauritius
Seychelles Is.
Zanzibar
Aden
Suez
Alexandria
Malta
Gibraltar
Lisbon
Valencia
Marseilles
Genoa
Trieste
Constantinople
Odessa
Black Sea
Caspian Sea
Moscow
St. Petersburg
Archangel
Copenhagen
Christiania
Stockholm
Vadsö
Franz Josef Land
Spitzbergen
Nova Zembla
Siberia
Omsk
Irkutsk
Yakutsk
Verkhoyansk
Vladivostok
Nikolaievsk
Petrikof
Okhotsk
Behring Strait
Behring Sea
Yokohama
Nagasaki
Shanghai
Hong Kong
Manila
Philippine Is.
Guam I.
Wake I.
Hawaiian Is.
Honolulu
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Amoor R.
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Savannah
Jacksonville
Key West
Havana
Nassau
New Orleans
Galveston
Mexico
Vera Cruz
Guatemala
Panama
Kingston
Trinidad
Barbadoes
Martinique
Guadeloupe
Para
Maranham
Pernambuco
Bahia
Rio de Janeiro
Santos
Montevideo
Buenos Aires
Rosario
Mendoza
Valparaiso
Talcahuano
Antofagasta
Iquique
Callao
Paita
Guayaquil
Bogota
Caracas
Maracaibo
Curaçao
Jamaica
Cuba
Haiti
Porto Rico
Bermuda Is.
Azores
Madeira Is.
Canary Is.
Cape Verde Is.
St. Michael I.
St. Helena I.
Ascension I.
Cape Town
Durban
Mauritius
Seychelles Is.
Zanzibar
Aden
Suez
Alexandria
Malta
Gibraltar
Lisbon
Valencia
Marseilles
Genoa
Trieste
Constantinople
Odessa
Black Sea
Caspian Sea
Moscow
St. Petersburg
Archangel
Copenhagen
Christiania
Stockholm
Vadsö
Franz Josef Land
Spitzbergen
Nova Zembla
Siberia
Omsk
Irkutsk
Yakutsk
Verkhoyansk
Vladivostok
Nikolaievsk
Petrikof
Okhotsk
Behring Strait
Behring Sea
Yokohama
Nagasaki
Shanghai
Hong Kong
Manila
Philippine Is.
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Antofagasta
Iquique
Callao
Paita
Guayaquil
Bogota
Caracas
Maracaibo
Curaçao
Jamaica
Cuba
Haiti
Porto Rico
Arctic Circle
Tropic of Cancer
Tropic of Capricorn
Equator
International Date Line
Monday
Sunday
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FIG. 164.

provide continuous highways of water along lines of valuable trade, men build canals. The canal now under construction across the Isthmus of Panama will be of vast importance as it will shorten many of the much-used water routes of the world. (See Fig. 167.)

Water commerce is also carried on along the navigable rivers, between different places on the coasts of a country, and along canals which have been built to connect navigable rivers or lakes.

Land Commerce. Land commerce is now conducted largely by means of railroads, although, in some of the more rugged and thinly inhabited portions of the world, goods are still transported by caravans, by wagons, by pack animals, and, in some places, even on men's backs. (See Fig. 166.) Certain commodities, like oil and gas, are transported from place to place through great pipes that have been laid underground for many miles.

FIG. 165. *The winter home of a nomadic Indian, New Mexico.*

More and more of the power developed by great waterfalls is now being converted into electricity and carried long distances by means of wires stretched above the ground like telegraph and telephone wires. This power is chiefly used for electric lighting and for running street railways and machinery.

Methods of Communication. With the development of commerce, quicker communication between one part of the world and another has become necessary. The most common means of communication between people who want to engage in business is by letters carried from place to place by the mails. When the greatest haste is desired, messages are also sent by means of the telegraph or the telephone.

Telegraph cables across the Atlantic Ocean have been in use since 1866, and in the year 1903 two cables were completed across the Pacific Ocean. Now all the great countries of the world are connected with one another by telegraph. (See Fig. 164.)

The latest invention for rapid communication between places is what is known as wireless telegraphy, by means of which messages are sent through the air from one point to another many hundred miles away by electricity.

Government. The successful development of any community depends largely upon whether people regard the rights of their neighbors, or whether they try to live for themselves alone. In every group of people some form of government is necessary, because there are always some individuals who will not do as they should unless they are made to do so. Government has arisen also because there are many things which everyone in a community needs, but which a few people attend to better and more cheaply for the community as a whole. The Post Office Department and the Lighthouse Service are perhaps the best illustrations of conveniences that can be provided for by the government better than by each person for himself.

The Forms of Government; the Home. The simplest form of government is that of the *home*, in which the parents establish certain rules which must be obeyed in order

that all the members of the family may live together in comfort and happiness.

The Village, Town, or City. The next largest form of government is the *village*, *town*, or *city*, which includes many homes and the lands surrounding them. In such a group some central form of government is necessary in order that one family may not interfere with the peace or comfort of the whole community, and in order that conveniences like streets and schools, which are of use to all, may be properly cared for.

In the villages of primitive peoples some one man, known as the *chief*, establishes the laws to be obeyed by all and settles troubles between individuals. Among most civilized peoples, the officers to make and execute the laws are elected by the people. These officers act in the name of the community in establishing laws and in carrying on business which affects the whole community.

FIG. 166. *Loading a camel caravan.*

The State. Just as a village, town, or city includes all the families living therein, so the highest form of government, the *state* or the *nation*, is made up of all the communities within its territory. The officers of a state have control of all the public conveniences, like asylums and prisons, which are at the service of all the inhabitants.

In the United States, however, the term *state* has a restricted meaning. It is a division of government which stands between the community and the nation, and exercises some of the powers ordinarily exercised by a nation. Our national government establishes laws in reference to the relations of states, regulates affairs with other nations, maintains an army and a navy, and attends to all matters in which more than one state is concerned.

Democratic and Monarchical Government. A national government, all of whose officers are elected by the people, is called a democracy. If the officers are appointed by representatives of the people, the government is a republic. Our government partakes of both forms and is therefore properly called a democratic republic. The greater part of its officers are appointed, and all, whether elected or appointed, act in the name of the people. It is far different from a monarchy, where one man acts for the whole nation.

All these kinds of national government may differ in form, but they have grown up for the same reasons, because individuals living in groups cannot be allowed to act as they wish without thought for their neighbors, and because many matters arise which must be managed for the benefit of the group as a whole.

Relation of Geography to Government. The need for some form of government has arisen everywhere because the geographical conditions have made it possible and advantageous for people to live in groups. The form of government, however, is not directly geographical, because it has been devised by men and not determined in its features by the geographical conditions to be found in any region.

Questions and Exercises

(1) Where are savage tribes living to-day? (2) Why are barbarous tribes higher in civilization than savages?

(3) Name ten rivers in the United States that provide cheap and easy transportation; ten in

Europe. (4) How is transportation interfered with on the Nile? The Congo? The St. Lawrence?

(5) Write the names of six countries of the world that have coasts favorable to commerce. (6) Opposite each place the names of the chief harbors of that country.

(7) Give instances where canals have facilitated land and water commerce. (8) Make a drawing showing the bodies of water which canals have connected.

(9) Which of all the races of man has taken the smallest part in trade? (10) Which the lar[illegible]

(11) In what way does good government promote trade? (12) What means does your government take to further trade? (13) What branch of our national government is of most help to you?

FIG. 168. *A reindeer sledge, a means of transportation in cold countries.*

XXII. HOW MAN CHANGES THE GEOGRAPHY OF THE WORLD

Man is continually changing the geography of the world in many ways. He cannot change the climatic conditions, but [illegible] has learned to occupy many regions in spite of the climate. The white man can endure the cold of the polar regions if he builds comfortable houses and wears furs and thick clothing. (See Fig. 168.) He is constantly learning better how to live in the unhealthful tropical countries, but in all cases he lives in spite of the climate and not because he has changed it in any way.

FIG. 167. *A dam across the Oswego River, New York, to turn the water into the Oswego Canal, used for transporting products.*

How Man Changes the Distribution of Water. Man modifies the distribution of water over the world in many ways. Water bodies he connects by means of canals (see Fig. 252), and the water from rivers and lakes he uses to irrigate his fields. Lakes are sometimes made by building dams so that the water may be used for irrigation or for power. Swamps and lakes are drained so that the land can be used for agriculture.

The mouths of rivers and estuaries are kept from filling or silting up by making the water pass through narrow channels so that the river detritus is carried far out to sea. The shores of lakes and oceans, particularly about harbors, are changed either by filling up the shallow water so as to make more land, or by deepening the water so as to make a larger harbor.

How Man Changes the Aspect of the Land. Man also changes the form of the land in many ways. He not only increases the amount of land in the way we have mentioned above, but oftentimes he levels hills into plains. In other places he keeps the water from wearing into the river banks or hillsides, and thus preserves the land. Sometimes he turns rivers from their natural course in order to build a railroad or a canal, and in large old river valleys he builds levees to keep the water from flooding the lowlands.

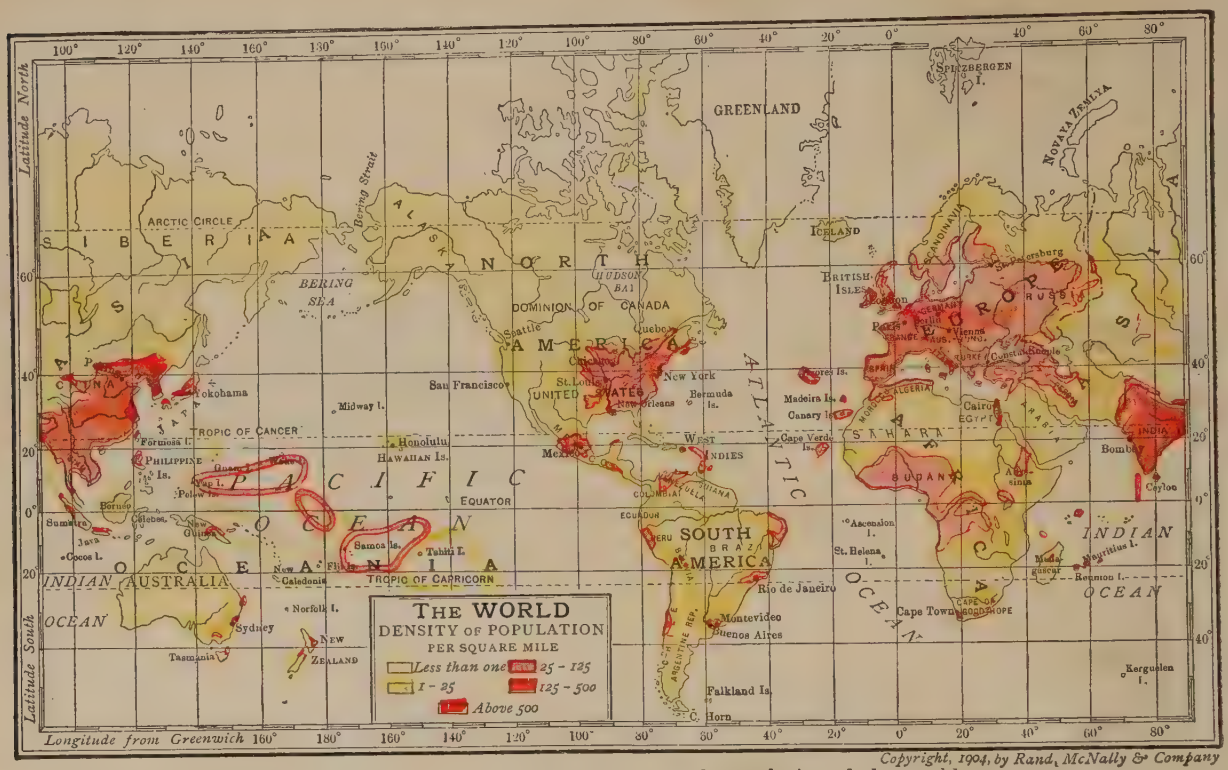

FIG. 169. *A map showing the density of population of the world.*

How Man Changes the Distribution of Plants and Animals. The greatest effect of man geographically, however, is seen in the distribution of animals and plants. The domesticated animals have been carried into remote parts of the world, and food plants have been made to grow wherever the climate and soil conditions permit.

Man has also extended the distribution of many plants and animals that are harmful rather than helpful. The seeds of weeds have been carried in grains and have run riot in new countries. Rats, mice, and vermin have been unconsciously carried by people as they have migrated into a new region.

Sometimes animals transported for the sake of their helpfulness have become nuisances, because they have developed so rapidly in the new country. In this way Australia was overrun by rabbits until now government action has been taken to try to exterminate them. The gypsy moth brought into the United States with the silkworm is now devastating the forests of the eastern part of the country in spite of all that people can do.

Increase in the Distribution of Man. These are only a few of the many ways in which man is continually making the distribution of certain animals and plants more general. The distribution of men themselves is continually becoming more complex, because, as old countries have become overpopulated, the people have migrated into new regions, until now the larger part of the land useful to civilized man is occupied. (See Fig. 169.)

Thus, while the natural features of the world influence man in determining what shall be his industries and form of life, and outline the area in which he can live, man in turn changes the natural features of the world as much as he can to suit his own desires and convenience, and to increase the area in which he can earn a living.

PART II

COMPARATIVE GEOGRAPHY OF THE CONTINENTS

NORTH AMERICA

XXIII. THE CONTINENT AS A WHOLE

Size and Position. North America is third in size of all the continents, has more than twice the area of Europe, and contains about one-fifteenth of the population of the world. (See Fig. 28.) In latitude it extends over 62 degrees, or nearly 4,000 miles, north and south. Its width is greatest in the far north, where it covers more than 168 degrees of longitude. (See Figs. 170 and 183.)

In the higher latitudes North America lies close to the Old World, approaching it most closely on the northwest where Bering Strait separates the land masses of Asia and North America by only thirty-six miles. In the middle and southern latitudes, where the population is most dense and industrial life best developed, the distance between the Old and the New World is much greater.

North America includes the great countries of *Canada*, the *United States*, and *Mexico*, the several small nations of *Central America*, the many islands of the Caribbean Sea, generally known as the *West Indies*, and the large Danish island of *Greenland*.

FIG. 170. *North America.*

Coast Line. The coast line of North America is very long, and is greater in proportion to the land area than in any other continent except Europe. The most important large indentations are the *Gulf of Mexico* on the south and *Hudson Bay* on the north. The Gulf of Mexico, from its position in the warmer portion of the continent, is extremely important commercially, while Hudson Bay is surrounded by unproductive country and is icebound for several months each year.

The Western Coast. The northern portion of the western coast of North America is extremely irregular, and abounds in fiords and sounds. It is also skirted by a series of offshore islands, similar to those bordering Norway.

Southward from Puget Sound the coast is unbroken except for the small inlet of San Francisco Bay and the Gulf of California. Hence the number of good harbors is small. These are centered about *Puget Sound* and *San Francisco Bay*, where navigable rivers break through the high wall of the Coast Ranges. (See Figs. 171 and 172.) The natural harbor of *San Pedro*, on the coast of southern California, has been improved so as to

accommodate the commerce of a region which is progressing with great rapidity.

The Eastern and Southern Coasts. The eastern coast of North America north of New York City is extremely irregular, and has many harbors ranging in size from that of *New York*, the most important in the country, to fishing havens just large enough to accommodate a few small fishing vessels. The harbors in this region are close together, and coasting vessels can easily reach shelter in time of storm.

FIG. 171. *The rocky coast of California, looking into Golden Gate, the entrance to San Francisco Bay.*

South of New York the coast line is extremely regular, and is broken only at intervals by the occasional indentation of an estuary, like that of *Delaware Bay* or *Chesapeake Bay*, and by many small breaks in the coast bars which are excellent for small vessels. These two estuaries, together with the mouth of the *Mississippi*, are the main outlets for commerce in this region.

A large part of the southern Atlantic shore is bordered by a series of barrier beaches, separated from the mainland by lagoons. Some of these beaches extend out into the ocean as long capes, as *Cape Hatteras*, or as submerged spits which are dangerous to ocean commerce.

FIG. 172. *The rugged coast of Oregon, showing islands left by the wearing away of the weaker rocks.*

Bordering the eastern shore there is a broad, continental shelf, extending off New York, for instance, more than one hundred and fifty miles. (See Fig. 173.) The shallowest water of this shelf is in the vicinity of Newfoundland. This area is known as *shoals* or *banks*, and abounds in valuable fishes. It forms the chief center of the fishing industry of Canada and the United States.

Surface. The surface of North America consists of two extensive highlands, extending in a general north-south direction, and two broad lowlands. (See Fig. 173.) Bordering the western coast from the Aleutian Islands to Panama is the great *Cordilleran* or *Western Highland*. Lower and less rugged than the Cordilleran Highland is the *Appalachian Highland*, which runs nearly parallel with the Atlantic coast from New Brunswick to Alabama. Between the Appalachian Highland and the Atlantic Ocean is the low-lying *Atlantic Coastal Plain*, which begins at New York City and extends southward into northern Mexico. Between the two highlands, and extending from the Arctic Ocean to northern Mexico, is the *Great Central Plain*, a vast tract of land, low in the east and rising in the west to meet the foothills of the Cordilleran Highland.

The fact that the highlands of North America extend in a general north-south direction is of great importance in determining the climate of the continent. The westerly winds from the Pacific Ocean are deprived of much of their moisture by the lofty Cordilleran

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FIG. 173.

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FIG. 174. *The Three Sisters, famous peaks in Alberta.*

Highland, while a large area of the western Mississippi Basin and the Plateau States lying to the leeward of the great mountain wall to the west has a scanty rainfall. In the continent of Europe the highlands extend, approximately, in an east-west direction, and hence the westerly winds, blowing from the Atlantic Ocean, can carry their moisture far into the interior of the continent. This difference illustrates clearly the relation between mountains, winds, and rainfall.

The Cordilleran Highland. The Cordilleran Highland begins in Alaska and extends southward into Mexico. In the north it is narrow and forms no serious barrier to travel between the coast and the interior of Alaska. The highland grows broader to the south in Canada and the United States, reaching its greatest breadth between Colorado and northern California. Hence in this region it is an important barrier to trade and travel, not only because of its height and breadth, but also because it deprives the westerly winds of their moisture and leaves the plains to the east dry and parched.

The Cordilleran Highland is made up of many different mountain ranges: the *Rocky Mountains* in the east, the *Sierra Nevada* and the *Cascade Mountains* in the west, and in the extreme west along the Pacific Ocean, the *Coast Ranges*. These mountain ranges inclose within their borders in the United States two great plateaus — the *Columbia Plateau* and the *Colorado Plateau* — and an extensive area of interior drainage commonly known as the *Great Basin*.

The Rocky Mountains. The Rocky Mountains in the United States consist of many different ranges, separated from one another by high, level mountain valleys. They rise abruptly from the eastern plains and are broken by few water gaps or river valleys, so that the carriage roads and railroads crossing them are few in number. Some of the railroads which have been built to connect the eastern and western sections of the continent have been constructed at the expenditure of enormous sums of money.

The highest altitudes of the Rocky Mountains in the United States are in Colorado and New Mexico, where there are many peaks exceeding 14,000 feet in altitude.

The northern extension of the Rocky Mountains in Alaska and Canada includes *Mount McKinley*, the highest peak in North America, which has an altitude of more than 20,000 feet. Nearer the coast are two other great peaks which are nearly as high, *Mount Logan* and *Mount St. Elias*.

Plateaus. In the United States the western mountains of the Cordilleran Highland are separated from the Rocky Mountains by the *Columbia Plateau* and the *Colorado Plateau*, which lie along the rivers of the same names, and by the *Great Basin*. (See Fig. 173.) Farther north, in Canada, the east and

FIG. 175. *Peaks of the Rocky Mountains in the vicinity of Yellowstone Park.*

west mountain ranges come closer together and finally merge in one great highland mass.

Sierra Nevada and Coast Ranges. The western mountains of the Cordilleran Highland throughout the greater portion of their extent consist of two series of nearly parallel systems, the eastern and higher *Sierra Nevada* and *Cascade Mountains*, and the lower ranges bordering the Pacific Ocean, known as the *Coast Ranges*. The Sierra Nevada and the Cascade Mountains are lofty and majestic and contain many glaciers and old volcanic peaks. They are deeply cut by numerous river canyons which are famous for their beauty, and taken together form one of the grandest scenic regions of the world. *Mount Whitney*, in the southern Sierra Nevada, rises to an altitude of nearly 15,000 feet and is the highest peak in the United States. The Coast Ranges face the Pacific in an almost unbroken wall, so that they give but little opportunity for settlement near the coast.

FIG. 176. *A narrow valley in the White Mountains.*

Highlands of Mexico and Central America. In Mexico the Cordilleran Highland consists of a series of high mountain ranges close to the eastern and western coasts, and of the high Mexican Plateau lying between these ranges. The western ranges, of which the *Sierra Madre* is the most important, contain many slightly active volcanic peaks. In Central America the mountains run more nearly northwest and southeast, but still form an almost continuous mountain wall close to the coast. The highlands border the western coast so closely that throughout the larger part of Mexico and Central America there is little opportunity for settlement near the Pacific. Hence the population is sparse.

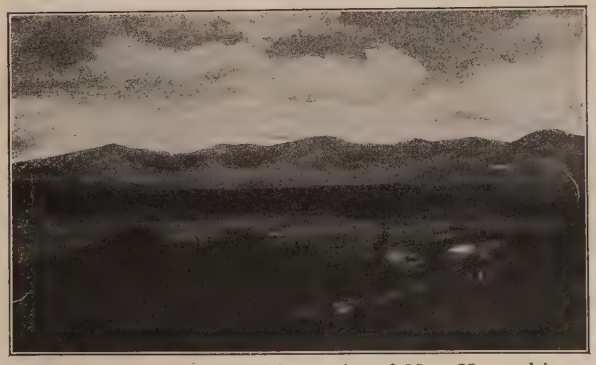

FIG. 177. *The White Mountains of New Hampshire.*

The Appalachian Highland. The Appalachian Highland extends from the Gulf of St. Lawrence to Alabama. It consists of the *Cumberland* and *Allegheny Plateaus* in the west, and the *Appalachian Mountains* in the east, with the *Great Valley*, a long, narrow depression containing portions of several rivers, lying between.

Compared with the Cordilleran Highland this eastern highland is only a gentle rise of land, for it is not more than 200 miles wide, and the greatest altitude is only a little over 6,000 feet. The highest peaks are found in New Hampshire and North Carolina.

This highland is an extremely important feature of the surface of the United States because it lies to the east of the great interior

plains with their vast commercial products, and separates these regions from the most important seaports of the country. We will therefore study its features more in detail when we come to take up the several groups of states of the Union.

Atlantic Coastal Plain. The *Coastal Plain* which borders the Atlantic Ocean and the Gulf of Mexico is extremely flat and nowhere rises much over four hundred feet above the sea. It is well watered by the many streams flowing down from the Appalachian Highland, which lies to the west, and contains large areas of valuable soil, which are well adapted to agriculture. The colonies of England planted in this region soon became prosperous and rich, and the coastal plain was the agricultural center of the country until the occupation of the Great Central Plain made the Mississippi Basin the most important agricultural area in America. (See Fig. 253.)

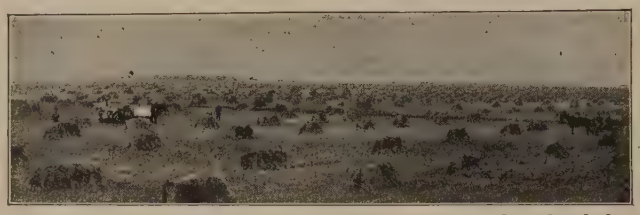

FIG. 178. *A wheat field in Manitoba. Notice how level the Great Central Plain is in this region.*

The Great Central Plain. The *Great Central Plain*, lying between the Appalachian and the Cordilleran highlands, extends from the Arctic Ocean to the Gulf of Mexico. It is lowest along the great Mississippi River and the Mackenzie River in Canada. In the portion east of the Mississippi River the slopes are gentle and the altitudes low. The streams here are only slightly sunk beneath the level of the country and hence the relief is nowhere great.

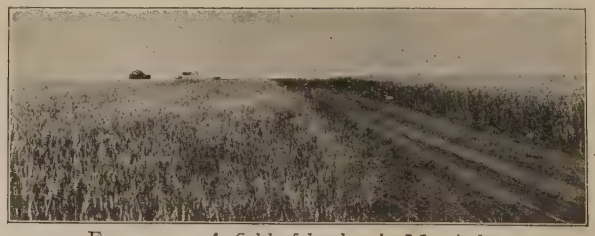

FIG. 179. *A field of barley in Manitoba.*

West of the Mississippi River the plain rises gradually in altitude, reaching a height of about 5,000 feet where the mountains actually begin. Throughout the western portion of the plain the rivers have cut several deep valleys, but these are far apart; as a result the surface in many regions has been but little modified by the rivers, and throughout large areas the plain extends to the horizon in broad, rolling swells, with hardly a break.

Owing to its gentle slopes and to the magnificent system of great rivers which flow through it, the Great Central Plain is an extremely important part of Canada and the United States, and is devoted largely to agriculture or grazing.

Glaciation. The surface features of northern and eastern Canada and the northeastern United States have been greatly modified by glaciation. (See Fig. 180.) A great glacier, originating somewhere in northern Canada, moved gradually out in all directions until it occupied this whole area, except a small region in Wisconsin. This sheet of ice was so deep that it covered the top of Mount Washington, the highest peak in the glaciated area of the United States. When the whole region was covered by ice it must have appeared much as the interior of Greenland does now, that is, as a broad snow and ice plain, unbroken by any points of land.

Throughout the glaciated area the soils were removed from the hilltops and dumped irregularly in the valleys; the rocks were scratched and grooved often to a depth of several inches, the scratches showing the direction from which the ice came. The great terminal moraine, already mentioned (see page 63), marks the southern limit of this ice sheet.

In the glaciated area nearly every stream is broken by rapids or waterfalls, due to

ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
BERING SEA
ALASKA
ALEUTIAN IS.
BEAUFORT SEA
BANKS ISLAND
VICTORIA ISLAND
PARRY IS.
ELLESMERE I.
GREENLAND
(TO DENMARK)
BAFFIN BAY
BAFFIN ISLAND
ICELAND (TO DEN.)
DOMINION OF CANADA
HUDSON BAY
LABRADOR
NEWFOUNDLAND
ST. JOHNS
GREAT BEAR LAKE
GREAT SLAVE LAKE
ATHABASKA L.
WINNIPEG L.
MANITOBA
THE GREAT LAKES
SUPERIOR
MICHIGAN
HURON
ERIE
ONTARIO
ARCTIC CIRCLE
MAGNETIC POLE
KLONDIKE REGION
ROCKY MOUNTAINS
UNITED STATES
NEVADA
Vancouver I.
Queen Charlotte Islands
Kodiak I.
Prince of Wales I.
Southampton I.
Melville Sound
Hudson Strait
Davis Strait
Denmark Strait
Greenland Sea
Lincoln Sea
Jones Sound
Smith Sound
Kane Basin
Baffin Bay
Cumberland Sd.
Frobisher B.
Ungava Bay
James Bay
Hudson Bay
Gulf of St. Lawrence
Strait of Belle Isle
Cabot Strait
Bay of Fundy
Gulf of Mexico
Strait of Juan de Fuca
Dixon Entrance
Puget Sound
Gulf of California
Mackenzie R.
Yukon R.
Columbia R.
Colorado R.
Rio Grande
Mississippi R.
Missouri R.
Ohio R.
St. Lawrence R.
Hudson R.
Great Lakes
Mt. McKinley
Mt. Logan
Mt. St. Elias
Mt. Whitney
Pikes Peak
Rocky Mts.
Sierra Nevada Mts.
Coast Range
Cascade Range
Wasatch Mts.
Black Hills
Appalachian Mts.
Alaskan Mts.
Alaskan Plateau
Yellowstone
Grand Canyon
Death Valley
Great Salt Lake
Salton Sea
Lake Winnipeg
Lake Nipigon
Lake of the Woods
Lake Athabaska
Great Bear Lake
Great Slave Lake
Lake Michigan
Lake Superior
Lake Huron
Lake Erie
Lake Ontario
Lake Champlain
Lake Winnipeg
Lake Manitoba
Lake Athabaska
Lake Nipigon
Lake of the Woods

short and rapid. Only five large rivers rise east of these mountains and drain into the Pacific. These are the *Yukon*, the *Fraser*, the *Columbia*, the *Sacramento-San Joaquin*, and the *Colorado*, which flows into the Gulf of California between the southern continuation of the Coast Range and the great Cordilleras of Mexico. Thus the waterways to the Pacific are few as compared with those to the Atlantic, and in consequence the ports are not the natural outlets for the products of the rich agricultural and manufacturing areas of the States of the Pacific Coast.

FIG. 181. *Crater Lake, high up in the Cascade Mountains. It lies in a great depression in the top of an ancient volcano.* (See page 40.)

In the northern portion of the Appalachians the divide between the rivers flowing into the Atlantic and the Mississippi is west of the highest mountains, so that several streams like the *Hudson*, the *Delaware*, the *Susquehanna*, and the *James* flow through the Appalachian Mountains in water gaps. (See Fig. 182.) Each of these river valleys thus forms a natural highway across the mountains, and is of great importance in present-day commerce, as it was in early exploration. In the southern Appalachians the divide is along the eastern ridge of the mountains. The rivers flowing to the east from this divide are therefore shorter than some of the northern rivers already mentioned.

FIG. 182. *The Water Gap of the Delaware River.*

The basin of the *Great Lakes* and the *St. Lawrence River* is separated on the north from the Arctic and Hudson Bay drainage by the low Height of Land already mentioned. The St. Lawrence River is interrupted by many rapids, around which canals have been built, so that in summer it is possible for ocean-going vessels to reach the upper end of Lake Superior or halfway across the continent. Thus, the St. Lawrence River and the Great Lakes together form the only natural water route into the interior of the country from the east, as the Mississippi does from the south. (See Fig. 184.)

The divide between the Great Lakes Basin and the Mississippi Basin is in places very low. In fact, the divide between the Chicago River, flowing into Lake Michigan, and the Des Plaines River, flowing into the Mississippi, is only about fifteen feet above the level of the lake. The low and short divides between adjoining streams were of great importance during the exploration of the interior of the continents, because they offered the easiest portages. In many cases towns were developed at these carrying places, especially in the Eastern and Northern States of the Mississippi Basin. Later these natural highways became the routes of canals and railroads.

Climate. North of the Tropic of Cancer North America lies in the region of westerly

Revised, 1911

FIG. 183.

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winds during the winter, while in the summer the Heat Equator extends as far north as Arizona. (See Figs. 82 and 84.) The larger part of the continent, therefore, lies in the region where the climatic differences between summer and winter are great. Owing to its size and position, North America has the most strongly marked continental climate in the world except Eurasia.

The Western Coast. The most uniform conditions of temperature and moisture are found along the western coast, where the winds blowing in from the Pacific bring the warmth and moisture acquired from the ocean. (See Fig. 97.) On the mountain slopes bordering the coast north of central California the annual rainfall is very heavy, in some places more than a hundred inches. (See Fig. 97.) In summer when the westerly wind system has moved north but little rain falls in this region even on the high mountain peaks, but in winter the mountains receive abundant rainfall as far south as southern California. The westerly slopes of the mountains in the rainy region, being well watered, are covered with magnificent forests. (See Fig. 119.) The eastern slopes and the interior valleys are drier and more barren.

The Great Central Plain. The great interior plain of North America is extremely cold in winter and hot in summer. The outblowing winds of winter are so dry that this region receives but little moisture at that season, except in the southern Mississippi Valley. In the summer growing season, however, when the winds blow inland, it is fairly well watered. The heaviest rainfall is in the eastern and southern portions. The warmest portion of the plains region in summer is along the lower Missouri River, and the center of the extreme continental cold in winter is in Canada, in Alberta. (See Figs. 82 and 84.)

The Eastern Coast. The eastern coast of North America has the most rapid changes in weather of any portion of the continent. In winter when a storm center is occupying the interior, the northeast winds, passing over the cold Arctic Current, usually bring snow, while the southeasterly winds, coming from over the warmer North Atlantic Drift, bring rain. Inasmuch as the storms usually move from the southwest to the northeast, they follow a path nearly parallel to the Appalachian Mountains, and thus the rainfall is evenly distributed and one side of the highland is not dry and the other wet, as is the case in the Cordilleran Highland. The cold northwesterly winds of winter after the passage of a storm often cause extremely low temperatures, so that once in every seven or eight years killing frosts may extend even into southern Florida.

The Gulf Coast. Along the Gulf Coast, especially west of the Mississippi River, there are well-marked monsoon winds with the change of season from winter to summer. The summer winds blowing in toward the Mississippi Valley come from the warm waters of the Gulf of Mexico and carry an abundance of moisture, a large part of which falls as heavy rain near the coast. (See Fig. 97.) As a result the region about New Orleans has the heaviest rainfall found in the United States, with the exception of that in Washington and Oregon. (See Fig. 97.)

The western part of Texas, which is out of the range of the Gulf winds, is very dry.

In Mexico and Central America, where the prevailing climate is that of the trade-wind region, the east coast is wet and the west coast dry, although in no case a desert. As the winds rise in passing over the eastern slopes they lose the larger part of their moisture, so that the high plateaus in northern Mexico are exceedingly dry.

Vegetation. Northern North America, including the island region of Arctic America as far south as the coast of Hudson Bay, and the coast of Labrador, is covered by

NORTH AMERICA
(Commercial)
SCALE
0 100 200 300 400 500 600 700 800
760 Statute Miles to one inch
Principal Products .....
Navigable Portions of Rivers ....
Most important Railroads .....
Most important Steamship Lines .....
Longitude 120° West from Greenwich
Latitude North
DOMINION OF CANADA
UNITED STATES
MEXICO
CENTRAL AMERICA
WEST INDIES
SOUTH AMERICA
ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
CARIBBEAN SEA
GREENLAND (TO DENMARK)
ICELAND (TO DENM.)
ALASKA
HUDSON BAY
LABRADOR
NEWFOUNDLAND
Tropic of Cancer
Equator
Revised, 1910
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FIG. 184.

perpetual ice or by the grassy *tundra*. (See Fig. 119.) This vast area is unoccupied except by a few Eskimos along the coast, or by wandering Indians who hunt here in the summer months.

South of this area is the broad region of coniferous trees, which includes northern New England and the region about the Great Lakes. (See Fig. 119.) Hemlock, spruce, fir, cedar, and white pine, all valuable as lumber or for paper pulp, are the principal coniferous trees. Coniferous trees also cover the mountain tops and western slopes of the Cordilleran Highland where the climatic conditions, because of the altitude, are similar to those found in the higher latitudes. (See Fig. 185.)

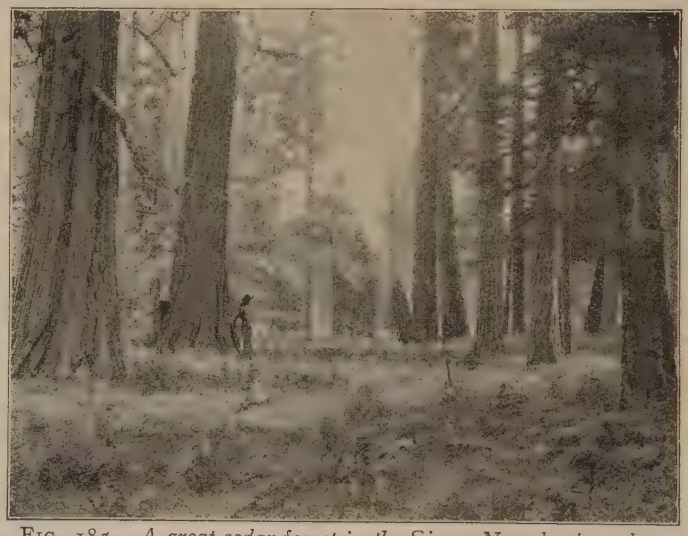

Fig. 185. *A great cedar forest in the Sierra Nevada, in a deep valley north of the Yosemite, California.*

The region east of the Mississippi River is a forest and grassland, with the uncultivated areas occupied by either coniferous or deciduous trees. The southeastern coast from Norfolk to New Orleans contains many palms and other subtropical trees, including the long-leaf or hard pine, which furnishes valuable lumber.

This forest and grassland area gradually merges on the west into the open, grassy prairies or steppes of the Mississippi Valley. Between the 100th meridian and the foothills of the Rocky Mountains the steppes are more arid and trees are practically absent except along the water courses. Within this arid steppe region there are small desert areas, but the largest deserts of the United States lie between the Rocky Mountains and the Sierra Nevada. Here the rainfall is slight, as the winds have been robbed of their moisture in crossing the mountains lying to the west. This arid steppe region includes the plateau of Mexico. Central America is everywhere occupied by dense, subtropical forests or by savannas. These subtropical forests include many valuable timber trees, like rosewood and mahogany; also banana trees, rubber trees, and others that yield valuable commercial products.

Animals of North America. The characteristic wild animals of North America have already been mentioned. (See page 74.) Many other animals not distinctive of North America are found in great numbers in the wild and unexplored regions. Great herds of elk exist in Canada, (see Fig. 137) and the grizzly, cinnamon, and black bear are common in the more rugged mountains of the western highlands of the continent.

People. Except for the Eskimos of Alaska and northeastern North America, the whole continent was formerly occupied by Indians. These Indians were of many tribes, speaking different languages, and ranging in civilization from the true savages to the barbarous tribes who practiced agriculture to some extent. Now the Indians of North America are almost wholly restricted to the western and northern portions of the continent and to the mountains of Mexico and Central America. (See page 79 and Fig. 186.)

The larger portion of North America is occupied by descendants from the early colonists sent out by the European nations,

or by immigrants who have recently come from Europe. The population is most dense in the eastern portion of the United States, where the colonies established by the European nations were planted. English is spoken generally throughout the continent, although in some parts of Canada and Louisiana French is the prevailing language, and in Mexico and Central America, and for the most part in the West Indies, the people speak Spanish.

Within recent years there has been a great migration of people from Europe to America. Some of these immigrants have settled in the cities, but great numbers have made their homes in the extensive agricultural lands of western United States and southern Canada. Germans and Norwegians are very numerous in the northern states of the Mississippi Basin and the Irish and Jews are found in the larger cities.

FIG. 186. *Alaskan Indians and their home.*

In the southern Atlantic and Gulf states, in the West Indies, and in Central America where the warm climate makes it difficult to carry on continuous labor, there are great numbers of negroes, mostly descended from slaves brought from Africa to till the plantations. The early Spaniards who came to Mexico and Central America married with the Indians, and their descendants, known as Mexicans, are now the most powerful people in these regions.

Questions and Exercises

(1) Draw an outline map of North America. On it write the names of the great countries and draw their boundaries. (2) Write the names of the surrounding waters and chief islands and groups of islands. (3) What is the scale of the political map of North America? (4) Using this scale, find distance between New York and San Francisco; between Montreal and Vancouver.

(5) Trace the continental shelf. Where is it broadest? (6) What name is given to the broad shelf off Newfoundland? (7) For what industry are these waters noted? (8) Where are similar shores in Europe?

(9) Draw the chief rivers of North America. (10) What advantages result to this continent from having a great river system in its central portion? (11) Draw one transcontinental route. Compare the length of this route with that of the Trans-Siberian Railroad. (12) Compare the difficulties of building these routes.

(13) Why was the Central Plain not settled until after the Atlantic Coastal Plain? (14) Why did not the early explorers enter the Central Plain by way of the Mississippi? (15) Mention a continent which has no such pathway into the interior. (16) Calculate the difference in length between the route from Liverpool to Montreal, and from Liverpool to New York. (17) Which is shorter? (18) What disadvantages has the northern route?

(19) Which coast of North America has the greatest range of temperature? The least range? (20) Compare the annual range of Winnipeg and Sitka; Winnipeg and Quebec. (21) Which sections have an even climate? Why? (22) What sections have a continental climate? Why? (23) What is the annual range of temperature in your home locality? (24) Have you an oceanic or continental climate? (25) Account for the heavy rainfall of the west slope of the Cascade Mountains. (26) Why does the Columbia Plateau get so little? (27) Why does Winnipeg have less rain than New Orleans? (28) What winds bring rain to the Atlantic Coastal Plain? To Quebec? To Vancouver? (29) What winds bring rain to your home? (30) Why are the plateaus of Mexico dry?

(31) What is the average rainfall of the tundra region? The steppes? The region of coniferous trees? Deciduous trees? The subtropical areas? (32) Make a list of these regions; opposite each write its rainfall and characteristic vegetation. (33) In which vegetation region do you live? (34) How great is the rainfall at your home? (35) Write a description of your most common tree or plant and illustrate by a drawing.

XXIV. THE UNITED STATES AS A WHOLE

Size and Extent. The United States, not including Alaska and the many dependencies, has an area of 3,026,789 square miles; that is, it is a little larger than the continent of Australia. Including Alaska, the Philippines, Hawaii, Porto Rico, and a few scattered islands in the Pacific Ocean, the area is 3,743,344 square miles, or nearly equal to that of all Europe. The United States extends from the Atlantic to the Pacific, and from the Great Lakes to the Gulf of Mexico. It therefore includes parts of all the great physical divisions of North America and has an extremely varied climate.

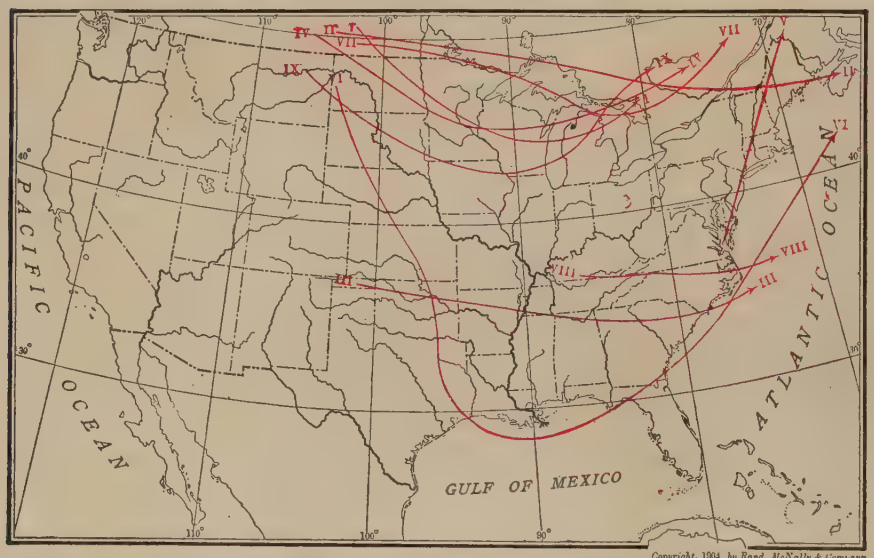

FIG. 187. *Storm tracks of the United States, showing the direction in which the areas of low pressure move across the country.*

The crops that are raised in the different regions, the occupations that the people follow, and the distribution of the population depend very closely on the surface features and on the climate. Consequently we need to know something about the surface and the climate of the different sections of the country before we study the detailed geographic conditions in the several groups of states.

CLIMATE

The Climatic Regions. There are three great climatic regions in the United States: the *East Coastal* and *Gulf*, the *Interior*, and the *West Coastal*. Three similar divisions are found in Canada, but the climatic features there differ somewhat from those in our own country, which is situated farther south, and therefore is, in general, warmer than Canada.

The East Coastal and Gulf Region. This region includes all the area east of the Mississippi River. It is characterized by cool winters in the south except near the Gulf, cold winters in the north, warm summers, and abundant rain through the year.

In winter, storms and clear weather follow one another across the continent in rapid succession and bring sudden and severe changes of weather to the eastern states. (See Fig. 187.) A change of temperature of fifty degrees or more may occur in twenty-four hours. As a result the ground is sometimes so thawed in winter that vegetation may start, only to be frozen again in a few days. It is for this reason that the fruit along the Atlantic coast is frequently damaged so that the crops are small. The inblowing stormwinds carry moisture from the ocean which falls largely as snow in the northern portion and as rain in the southern.

In summer, along the whole Atlantic and Gulf coast, the prevailing winds blow from the ocean; they therefore carry moisture to the continent, so that nearly all the region east of the 100th meridian receives more rainfall at this season than during the winter months. This is an important fact in

determining the success of agriculture, because summer is the growing season for crops.

During the summer months the rainfall is particularly heavy along the southern Atlantic and Gulf coast. In parts of this region rain falls almost daily, and the climate is very similar to that of the wet season in Mexico. Along the northeastern coast the rain is evenly distributed through the year, so that there is little difference between the winter and summer rainfall.

The summer temperatures throughout the eastern states are high, temperatures of over a hundred degrees frequently being reached in the heat of the day in many places during July and August. Owing to the relatively high temperatures of the summer and to the abundant moisture, both of which are favorable to the growth of agricultural products, the eastern portion of the country is the most densely populated and is a most important agricultural area, particularly for the raising of cereals, cotton, and rice.

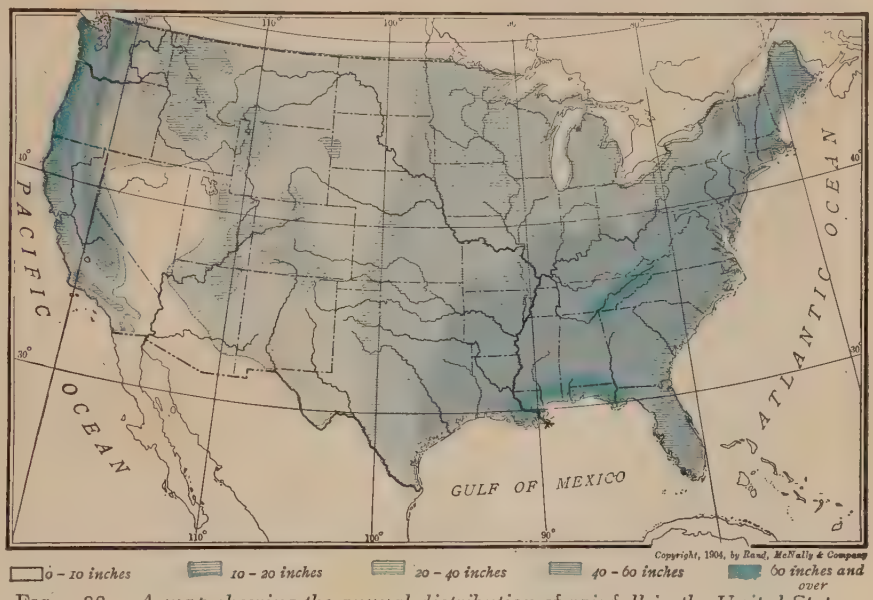

FIG. 188. *A map showing the annual distribution of rainfall in the United States.*

The Interior Region. The great interior region lying between the Mississippi River and the Cordilleran Highland has a wide range of temperature from season to season, but the changes are not generally so sudden as they are along the eastern coast. In January the average temperature of St. Louis is the same as that of New York, *i. e.*, 30° Fahrenheit (see Fig. 82); but in the summer the temperature of St. Louis is more than ten degrees higher on the average than that of New York. The average summer temperatures of the middle Atlantic coast here extend as far north as southern Canada. (See Fig. 84.)

The winters are cold and dry, with strong winds blowing out from the cold regions of Canada. These cold north winds, or *northers*, are unimpeded by mountain ranges. In the spring months they often sweep suddenly southward, carrying unseasonable temperatures even into southern Texas, and doing great damage to vegetation.

The summers are fairly dry, with clear skies, thereby favoring the growth of cereals like wheat and corn, which require a rather high temperature with abundance of sunshine. To the westward the climate grows drier, so that west of about the 100th meridian agriculture is, as a rule, unsuccessful without irrigation. (See Fig. 190.)

The dryness of this region is due to two causes: to its distance from the ocean, so that it receives little moisture from the east and south winds; and also to the great Cordilleran Highland, which shuts it off from receiving much moisture from the Pacific. The great plains are therefore mostly a steppe area, in which grazing is the leading industry.

UNITED STATES
(Physical)
SCALE
0 50 100 200 300
240 Statute Miles to one inch
EXPLANATION
above 8000 ft.
fr. 2000 to 8000 "
500 " 2000 "
100 " 500 "
0 " 100 "
SEA LEVEL
fr. 0 to 650 ft.
fr. 650 to 6500 ft.
below 6500 ft.
Latitude North
Longitude West from Greenwich
Revised, 1909
DOMINION
PACIFIC OCEAN
ATLANTIC OCEAN
MEXICO
GREAT BASIN
GREAT PLAINS
CENTRAL PLATEAU
COLORADO PLATEAU
ROCKY MOUNTAINS
CORDILLERAN HIGHLAND
CASCADE MTS.
COAST RANGE
SIERRA NEVADA
SAN BERNARDINO MTS.
SIERRA MADRE
LOWER CALIFORNIA PENINSULA
GULF OF CALIFORNIA
VANCOUVER I.
C. FLATTERY
Puget Sound
Mt. Baker
Mt. Rainier
Mt. Adams
Mt. Hood
Mt. Jefferson
Columbia River
C. BLANCO
Mt. Pitt
Mt. Shasta
C. MENDOCINO
San Francisco Bay
Sacramento R.
San Joaquin R.
Mt. Whitney
Tulare Lake
DEATH VALLEY
PT. CONCEPTION
San Pedro Bay
Colorado River
Gila R.
Humboldt R.
Great Salt Lake
GREAT AMERICAN DESERT
Wasatch Mts.
Green R.
Grand R.
Yellowstone River
YELLOWSTONE NATIONAL PARK
Missouri River
Fremont Peak
Continental Divide
BLACK HILLS
Missouri R.
Platte R.
Massive Mt.
Uncompahgre Peak
Pikes Peak
La Blanca Peak
Arkansas R.
Canadian R.
GRAND CANYON
SAN FRANCISCO MTS.
LLANO ESTACADO
(STAKED PLAIN)
Cerro Blanco
Pecos River
Rio Grande
TROPIC OF CANCER
110°
120°
100°
40°
30°

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The West Coastal Region. The climate of the west coast of the United States, including the western slopes of the Cordilleran Highland, is unusually even. At low altitudes there is but little change of temperature from month to month. The average winter temperature of San Francisco is as high as that of Charleston, South Carolina (see Fig. 82), and the coastal portion even south of San Francisco has a summer temperature like that of Ontario, New York, and New England. (See Fig. 84.)

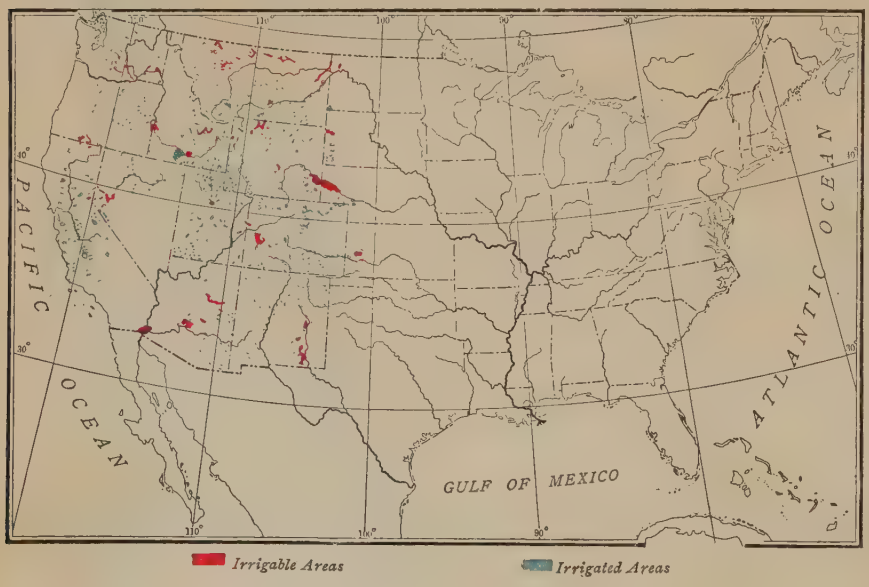

FIG. 190. *Irrigated and irrigable lands in the United States.*

Most of the rain throughout this region falls in winter, when the westerly wind area extends farthest south. In this season the rainfall of Washington, Oregon, and northern California is extremely heavy. (See Fig. 188.) The higher altitudes of this section have abundant moisture, and hence are clothed with heavy forests. But in summer even the mountain slopes are dry. Owing to the lack of summer rainfall, agriculture cannot be carried on in the larger part of this region except by means of irrigation.

The winter climate of southern California is delightful. Warm, fair weather prevails day after day, and the temperature rarely approaches the freezing point. As a result this region has become a favorite resort for people who cannot stand the rigor of the eastern winter.

The interior valleys and the plateaus lying between the bordering walls of the Rockies on the one side and the Sierra Nevada and Cascade mountains on the other are extremely dry. In fact, in certain parts of this region the rainfall is less than five inches a year. (See Fig. 188.) Most of this great area is therefore a desert or a steppe in which the population is sparse and scattered. Where irrigation is practiced towns and cities have grown up, but in Arizona, portions of New Mexico, southern Nevada, and eastern California extreme desert conditions prevail. The Mohave Desert, in southern California, is the driest region in the United States. (See Fig. 119.)

Questions and Exercises

(1) On an outline map of the world color in blue the United States and its possessions. Write or print the names neatly. (2) On an outline map of the United States indicate its climatic regions; locate your home. (3) Locate on the map Boston, Charleston, Washington, New Orleans, St. Louis, St. Paul, Buffalo, Kansas City, Carson City, San Francisco, San Diego, Seattle. (4) Using two colors, draw arrows for the January and July winds of these towns. (5) Write their January and July temperatures and their average yearly rainfall. (6) Compare the climate of Boston and St. Paul, and of Washington and St. Louis, and account for the difference. (7) Write a similar comparison between the climate of San Francisco and Kansas City, or of San Francisco and Washington. (8) Why has Omaha less rain than Memphis? San Francisco than Seattle? (9) Why is

the rainfall of Vicksburg so heavy? (10) What portions of the United States are thinly peopled because of the aridity of the region? (11) Study the passage of a storm across the *Interior* and *East Coastal* divisions and account for the frequent winter thaws that occur there. (12) Account for a cold wave. (13) How would the presence of an east-west mountain range across these sections change the climate of the southern and southeastern states? (14) Compare the distribution of rainfall and population in the United States. (15) What similarity exists? (16) What influence has amount and distribution of rain had upon the density of population? (17) On the map used in Exercise 2 draw the one hundredth meridian. What is the chief industry to the east of this line? Why? (18) Locate the steppe area. (19) Locate two towns in this area. (20) Name and locate all the regions in the United States where the presence of a mountain barrier makes a difference in the rainfall of the two slopes. (21) Which climatic division has an *oceanic* climate? (22) What are the characteristics of such a climate? (23) Why does the western coast have so cool a summer? (24) Draw a cross section of the windward and leeward slopes of the Sierra Nevada and show by colors the difference in the rainfall of these slopes; indicate also differences in vegetation. (25) Tell about the winter climate of southern California. (26) Locate the Mohave Desert and give reasons for aridity. (27) Which transcontinental routes pass through large desert areas?

(28) Write a composition about the climate of your home; tell how it affects your life.

XXV. THE UNITED STATES AS A WHOLE; PHYSICAL DIVISIONS

The United States contains several well-marked physical divisions, which vary greatly in their characteristics, and must be considered separately.

THE ATLANTIC AND GULF COASTAL PLAIN

Position. The Atlantic and Gulf Coastal Plain is a broad, flat, low-lying plain beginning at New York and extending southward throughout the Atlantic Coastal and the Gulf states. It includes the whole of Florida and Louisiana, the larger portion of Mississippi, and the alluvial plain of the Mississippi River south of the Ohio River. The Coastal Plain extends off shore in the great continental shelf. (See Fig. 173.)

Soil. The rocks forming the surface of the plain are weak and unconsolidated. The soil is everywhere deep and is generally fertile, but its fertility depends upon the character of the underlying rock from which it has been formed. In some of the states, as in North and South Carolina, broad strips of barren soils occur. These areas are covered with forests, while the other soils are for the most part devoted to agriculture. The coastal portion of this area, in the Southern States of the Atlantic Coast, is made up of marshes which are devoted to the cultivation of rice.

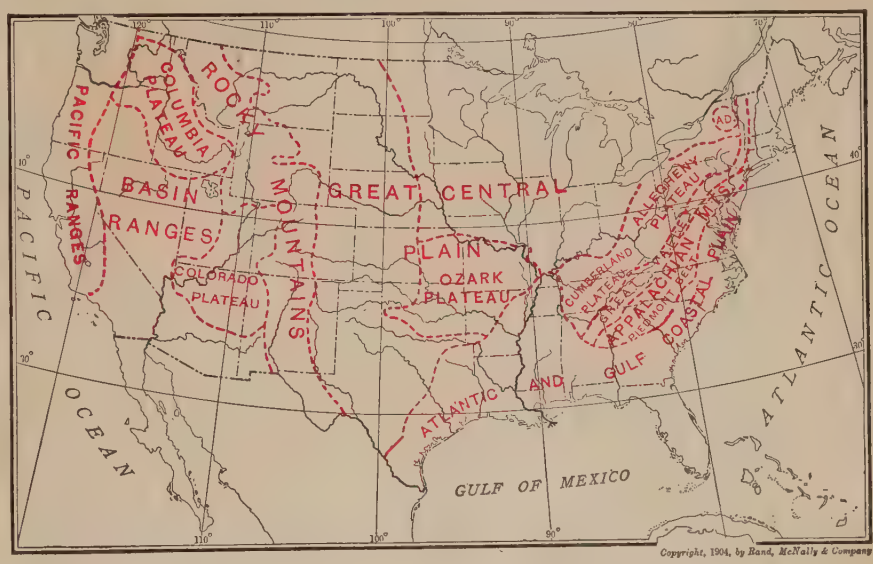

FIG. 191. *Physical divisions of the United States.*

Surface and Drainage; Coast Line. The valleys are generally narrow, steep-sided, and shallow, because the plain rises so little

UNITED STATES
(Political)
SCALE
0 50 100 200 300
240 Statute Miles to one inch
Capitals of Countries ★ Capitals of States ⊙
Other Cities •
Relative importance of places shown by size of type
Latitude North
Longitude West from Greenwich
Revised, 1911
PACIFIC OCEAN
GULF OF CALIFORNIA
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
COLORADO
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
TEXAS
MEXICO
DOMINION
Vancouver I.
C. Flattery
Grays Harbor
C. Disappointment
Seattle
Spokane
Olympia
Portland
Astoria
Mt. Rainier
Mt. Adams
Columbia R.
Walla Walla
Snake R.
Salmon R.
Lewis R.
Flathead L.
Milk R.
Missouri River
Great Falls
Helena
Anaconda
Butte
Yellowstone River
Bismarck
Plateau du Coteau du Missouri
Yellowstone National Park
Big Horn R.
Sheridan
Cheyenne R.
Lead
Black Hills
Boise
Pocatello
Fremont Peak
Rock Springs
Laramie
Cheyenne
Niobrara R.
Platte R.
Grand Island
Hastings
Republican R.
Great Salt Lake
Ogden
Salt Lake City
Great American Desert
Reno
Virginia City
Carson City
Sacramento
San Francisco
Oakland
Berkeley
San Jose
Pt. Arena
C. Mendocino
Eureka
Shasta
Lassen Peak
Humboldt R.
Black Rock Desert
Yosemite National Park
Wheeler Peak
Sevier Lake
Virgin R.
Green R.
Grand Junction
Grand R.
Gunnison R.
Uncompahgre Mts.
Leadville
Colorado Springs
Pikes Peak
Cripple Creek
Pueblo
Denver
Boulder
Greeley
South Platte R.
Arkansas R.
Smoky Hill R.
Republican R.
Cimarron R.
Trinidad
Raton
Mt. Whitney
Death Valley
Mohave Desert
Pasadena
Los Angeles
San Pedro Bay
Santa Barbara Islands
Pt. Conception
San Bernardino Mts.
San Diego
Colorado R.
Grand Canyon
San Francisco Mts.
Prescott
Phoenix
Salt R.
Gila R.
Globe
Tucson
Santa Fe
Albuquerque
Las Vegas
Truchas Peak
Canadian R.
Amarillo
Pecos R.
Las Cruces
El Paso
Roswell
Cerro Blanco
Rio Grande
Fort Worth
Waco
San Angelo
Austin
San Antonio
Laredo
Nueces R.
Nogales
Bisbee
Douglas
Hermosillo
Guaymas
Yaqui R.
Chihuahua
Rio Conchos
Sierra Madre
Culiacan
Durango
Mazatlan
Monterey
Saltillo
La Paz
C. San Lucas
Cedros
Tropic of Cancer
Victoria
6500 ft.
110°
120°
100°
40
30

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above the level of the sea that the rivers cannot cut into it deeply. Nearly all the larger streams are navigable for some distance, so that the products of the surrounding areas can be readily shipped. The most important water routes are the great *Mississippi* and the drowned valleys forming the *Chesapeake* and the *Delaware* estuaries.

From New York to South Carolina the shore is bordered by a series of barrier beaches, which form popular summer and winter resorts. These beaches are broken by few inlets, and consequently the harbors are far apart. The coast line of the southern states is also extremely regular and therefore has few good harbors.

Transportation; Climate. Owing to the gentle slopes and the extensive level uplands lying between the narrow river valleys, railroads can be built with ease in every direction. The network of railways that has grown up, together with the navigable rivers, makes it easy to ship the products of this area to market. The climate, as we have already seen, is moist and warm. Therefore agriculture flourishes throughout this region. The earliest colony in the United States was founded in the coastal plain of Virginia.

The Alluvial Plain. The Alluvial Plain of the Mississippi is an extensive area of rich, black alluvial soil bordering the Mississippi below the Ohio. (See Fig. 47.) The river throughout its lower course runs in a channel above the surrounding country, and is kept in bounds by levees. Every few years, however, the great river breaks through its bounding levees in the late spring and floods enormous areas, causing great damage to life and property. The soil and the climate of the southern portion of this alluvial plain of the Mississippi River are particularly favorable to the production of sugar cane and cotton, so that this part of the country is extremely important agriculturally.

FIG. 193. *The falls at Paterson, New Jersey, which furnish power for the extensive silk mills.*

THE PIEDMONT BELT

Surface. From New York to central Alabama the Coastal Plain is bordered on the west by a rolling region underlaid by strong rocks like those which form the Appalachian Mountains. The surface is varied, in places rugged. The rivers run in young or in mature valleys, in which the slopes are often steep, so that water power is abundant. (See Figs. 191 and 193.)

The Fall Line. Where the streams pass from the stronger rocks of the Piedmont Belt to the more gentle slopes formed in the weaker rocks of the Coastal Plain a series of rapids or falls occurs. This boundary line is commonly spoken of as the Fall Line. As the Fall Line marks in general the head of navigation on the rivers, and as it furnishes splendid water power, it provides town sites with great natural advantages.

The products of the agricultural areas of the Piedmont Belt and Coastal Plain can readily be transported to the Fall Line towns for manufacturing or for shipment. Thus in many cases conditions favorable to agriculture,

manufacturing, and commerce are found near the same spot. Hence the most favorably situated Fall Line towns rapidly became large cities, among which may be mentioned *Trenton*, N. J., *Philadelphia*, Pa., *Baltimore*, Md., *Washington*, D. C., *Richmond* and *Petersburg*, Va., *Raleigh*, N. C., *Columbia*, S. C., *Augusta* and *Macon*, Ga., and *Montgomery*, Ala.

Agriculture; Transportation. Owing to the altitude, the climate of the Piedmont Belt is a little colder than that of the Coastal Plain, but is everywhere sufficiently warm and moist for agriculture. This occupation therefore prevails throughout the area. The higher slopes are covered with forests, and the rocks contain some mineral wealth.

The slopes are not so steep but that railroads can be built with ease. Two of the principal lines connecting the northern ports with the agricultural southern states pass through the Piedmont Belt or along the western border of the Coastal Plain.

THE APPALACHIAN HIGHLAND

The Appalachian Highland, which runs from the St. Lawrence River to central Alabama, includes the whole of New England and parts of all the other States of the Atlantic Coast, as well as portions of West Virginia, Kentucky, and Tennessee. This great highland area may be divided into three regions, the *Appalachian Mountains*, the *Great Valley*, and the *Plateaus*, in each of which the physical features vary strikingly from those in any other portion. (See Fig. 191.)

The Appalachian Mountains. The eastern part of the Appalachian Highland, known as the *Appalachian Mountains*, extends through the whole of New England and in a narrow belt from the Hudson River to Alabama. The highest peaks are in New Hampshire and in North Carolina. The Appalachian Mountains are made up of strong rocks; they increase in height and width to the southward. The slopes are steep and the surface is generally rugged.

In the north where the rivers cross the highland in water gaps, the boundary between the States of the Atlantic Coast and of the interior was drawn west of the Appalachian Mountains.

Throughout the southern states, that is from central Virginia to Alabama, the mountains are so rugged and unbroken that they offer little opportunity for railroads, and thus have always been a barrier to trade and travel. The southern mountains form a divide between the rivers that flow into the Atlantic Ocean and the Gulf of Mexico, and

FIG. 194. *Lookout Mountain, Tennessee.*

are the natural boundary between North Carolina and Tennessee. (See Fig. 194.)

Agriculture is possible only in the lowlands and on the more gentle slopes, so that the population is scattered, and large parts of the region are left in forest. Hardwood trees are found in the south and coniferous trees particularly in the north. The mountain rocks contain some valuable minerals, but they are not worked to any extent.

The Great Valley. Just west of the Appalachian Mountains is a long, narrow depression of weak rocks, known as the *Great Valley*. This region, extending from the St. Lawrence River to Alabama, is bounded by the steep slopes of the Appalachians on the east and by the eastern rim of the Allegheny

UNITED STATES
(Commercial)
SCALE
0 50 100 200 300
240 Statute Miles to one inch
Principal Products ..... COTTON
Navigable Portions of Rivers ....
Most important Railroads .....
Most important Steamship Lines
Longitude West from Greenwich
Latitude North
Revised, 1911
DOMINION
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
COLORADO
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
LUMBER AND FRUITS
MINERALS
WOOL
LIVE STOCK
CORN
PACIFIC OCEAN
GULF OF CALIFORNIA
LOWER CALIFORNIA
SIERRA MADRE
MEXICO
TROPIC OF CANCER
Vancouver
Seattle
Portland
Spokane
Tacoma
Olympia
Salem
Boise
Helena
Butte
Great Falls
Missoula
Bismarck
Pierre
Sioux
Cheyenne
Laramie
Denver
Colorado Springs
Pueblo
Trinidad
Raton
Santa Fe
Las Vegas
Albuquerque
Roswell
Amarillo
Oklahoma City
El Paso
San Antonio
Laredo
Matamoros
Saltillo
Chihuahua
Guaymas
La Paz
Mazatlan
San Jose
Reno
Carson City
Sacramento
San Francisco
Oakland
Berkeley
Monterey
Los Angeles
San Diego
Santa Barbara
Pt. Conception
Mt. Whitney
Death Valley
Tulare Lake
Salton Sea
Phoenix
Prescott
Tucson
Yuma
Pocatello
Salt Lake City
Great Salt Lake
Great American Desert
Yellowstone National Park
Missouri River
Columbia River
Colorado River
Rio Grande
Pecos
Gila
Humboldt
Sierra Nevada
Cascade Range
Rocky Mountains
Grand Canyon
San Francisco Mts.
Lead Hills
Massive Mt.
Cripple Creek
Leadville
Pikes Peak
Canadian
Lake Winnipeg
Lake Michigan
Lake Superior
Lake Erie
Lake Ontario
Lake Huron
Lake Winnebago

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FIG. 196. *Scene at a coal mine in West Virginia.*

and Cumberland plateaus on the west. The Great Valley includes a series of parallel ridges rising above its general level. Between the ridges are narrow, fertile valleys. In the northern portion of the valley the ridges are on the west side, while in the south they are on the east. Hence in the north the Great Valley could be reached by explorers and settlers from the east without the necessity of traversing the narrow valleys of the ridges. In the south the ridges for a long time seriously retarded exploration from the east. The Great Valley contains many rivers which flow along it for a distance and then break through the eastern highland or western plateaus in water gaps, thus making the fertile valley accessible to trade and travel, especially from the east.

Lake Champlain and the upper portions of the Hudson, Delaware, Susquehanna, Potomac, James, and Tennessee rivers lie in this region. The valleys bordering the headwaters of these rivers are famous for their richness. This is particularly true of the Lebanon Valley in Pennsylvania, of the Shenandoah Valley in Virginia, and of the Tennessee Valley in Tennessee.

This great depression, extending from the St. Lawrence to Alabama, forms a natural highway for trade and travel between the northeastern and southwestern portions of the United States. In it have therefore grown up a number of important cities, of which *Chattanooga* and *Knoxville*, Tenn., are good illustrations.

The Plateaus. The Great Valley is bordered on the west, from New York to Alabama, by a great upland composed of the *Allegheny* and *Cumberland plateaus*. (See Fig. 191.) In the south the plateau rises to an elevation of about 2,000 feet, is but little cut by rivers, and faces the Great Valley in an almost continuous cliff of nearly a thousand feet in height. Hence the region is accessible with difficulty, the railroads are few, the population is scattered, and the country still retains most of its forest cover.

Deep under the ground are buried extensive coal deposits, which are available only where the surface rock has been removed, or where rivers have cut gorges so that the coal is exposed on the valley sides. Such is the case in Pennsylvania and in West Virginia, where the plateau is cut into by river valleys, so that the underlying coal is readily secured. (See Fig. 196.) Pennsylvania and West Virginia are therefore the great coal-producing areas of the eastern states. Owing to the existence of coal and of iron in Pennsylvania, manufacturing has grown up in this section of the country just as it has in similar places in the British Isles, in France, and in Germany. Several large cities like *Pittsburg*, Pa. (see Fig. 228), *Cleveland*, Ohio, and *Wheeling*, W. Va., have therefore developed in the northern plateau area.

In certain portions of the region the valleys are so numerous that the surface is very rugged, and cross-country traveling difficult.

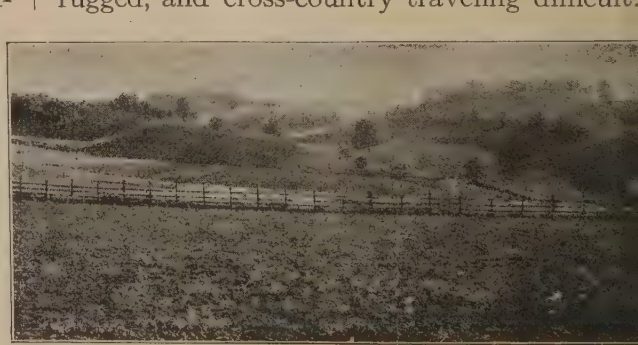


FIG. 197. *Rolling glacial hills of central New York, devoted to farming.*

The slopes are well wooded, and the population is scattered except along the river valleys and in the mining regions. The northeastern limit of this plateau, known as the Catskill Mountains, faces the Hudson River Valley in a high, cliff-like front.

Questions and Exercises

(1) In which physical division of the United States do you live? (2) What features mentioned in the description of this section have you seen? (3) Make a list of the states wholly or partly in this section. (4) Opposite each state write the names of the rivers, and opposite each river a town on that river. (5) Trace the continental shelf. Along which states is it broadest? Narrowest? (6) Which states have good harbors? Name the harbors.

(7) In what states is the alluvial plain of the Mississippi? (8) How wide is this plain in portions? (9) Why is it so fertile? (10) How do you account for the fact that the Mississippi runs in a channel above the surrounding country? (11) How do the people protect their lives and property from this river? (12) Why do people live near so dangerous a river? (13) Why are the cities in this plain located on the bluffs? Name such cities. (14) Have you ever seen *alluvial* soil? Tell about it.

(15) What rivers cross the Fall Line? (16) Locate each of the cities on the Fall Line mentioned in the text and tell what river each is on. (17) Why have large towns grown up at these points? (18) What does the word Piedmont mean?

(19) Name all the divisions of the Appalachian Highland and tell in what states each division is found. (20) What is the highest peak in New Hampshire? In North Carolina? (21) What do you know about the Green Mountains, the Adirondacks, the Blue Ridge? (22) Describe a journey from Baltimore to Atlanta. What states would you pass through? What rivers would you cross? Describe the surface, and name the crops you would see in the fields. (Consult Figs. 189, 192, 195.) (23) What railroads cross the mountains in the north?

FIG. 198. *A great mine at Lead, South Dakota.*

XXVI. THE UNITED STATES AS A WHOLE; PHYSICAL DIVISIONS (Continued)

THE GREAT CENTRAL PLAIN

The Highlands. The central portion of the United States, known as the *Great Central Plain*, extending from the Allegheny Plateau to the Rocky Mountains, is broken by few elevations of importance. A considerable highland area, composed of the *Ozark Plateau* (see Fig. 191) and the *Ouachita Mountains*, takes up much of Missouri, Kansas, Oklahoma, and Arkansas.

Bordering Lake Superior in Michigan and Minnesota there is an extensive glaciated upland of strong rocks like those of the Appalachians, which contains very valuable iron and copper deposits. The copper deposits are found deep underground, and are extensively mined. The iron deposits are near the surface, and in some places are secured with difficulty, owing to the extensive swamp areas formed in the glacial lakes.

The only other elevation of note in the Great Central Plain is the *Black Hills* in South Dakota and Wyoming. These hills rise as rugged, picturesque mountains, sharply contrasted with the level area round about. They contain extensive gold and silver deposits. (See Fig. 198.)

The Prairies and Plains. The Great Central Plain is in some places as level as a floor, in others rolling. (See Fig. 199.) In the western portion, where the altitude is greater, it is deeply cut by river valleys, so that the rolling *swells* of the plain are best seen from

the divides. The eastern portion of this region, lying in the humid area and commonly known as the *prairies*, is a great natural grassland in which agriculture flourishes. In fact the prairies are the great food-producing region of the United States. The western semi-arid section which is devoted primarily to grazing, is commonly known as the *plains*.

FIG. 199. *Reaping wheat in the great level fields of North Dakota.*

Owing to the even surface of the prairies, railroads have been built in almost every direction, until now the whole region is covered with a network of railroad lines. The excellent facilities for land transportation and the magnificent water routes furnished by the Great Lakes and by the Mississippi enable the products to be sent to market with ease. Hence this region has rapidly become wealthy and is the seat of many large cities noted for their trade and manufactures.

THE ROCKY MOUNTAINS

Position; Surface. The Rocky Mountains, as we have seen, are the high mountain wall bordering the Great Central Plain on the west. The surface is rugged, the slopes are steep and long, and the passes are high. Yet, though the Rocky Mountains do not offer many opportunities for travel, they were, during the time of the exploration of the West, by no means so difficult a barrier as the arid plains to the east and the deserts of the west.

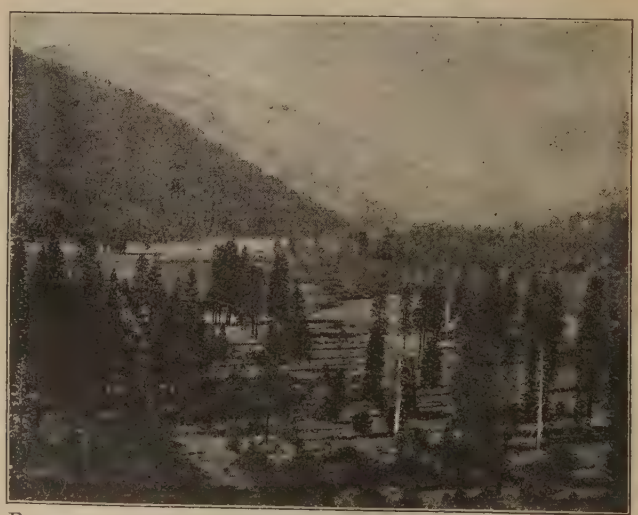


FIG. 200. *A high, level "park" in Colorado. The valley has been partially filled by the detritus from the mountain sides.*

Climate; Industries. The climate is cold and moist, with the heaviest rainfall on the western slopes. The rocks contain silver and other metals in abundance, so that mining is the chief industry. Grazing is the only other occupation of importance, though lumbering is carried on in some regions.

Population; Scenery. Large cities have grown up about the mining centers. Elsewhere the population is found mostly in the occasional mountain valleys, especially in the high, level "parks" of Colorado and New Mexico. (See Fig. 200.) In the less populated regions wild animals, like bears and mountain sheep, are numerous, so that portions of the area are favorite resorts for sportsmen.

The *Yellowstone National Park*, famous for its hot springs and geysers, lies in the Rocky Mountain region. It is very picturesque, and is much visited by tourists from all parts of the world.

THE COLUMBIA AND THE COLORADO PLATEAUS

The Columbia Plateau. In Washington, Oregon, and Idaho, bordering the Columbia River, is a great plateau area underlaid by volcanic rocks and known as the *Columbia Plateau*. The Columbia and its tributary, the Snake, have cut magnificent canyons into this region, so that the scenery in places is strikingly beautiful. The climate is everywhere dry, and

agriculture is unimportant and very limited, except for wheat raising, which is carried on extensively in eastern Washington and Oregon.

The Colorado Plateau. The most famous and best known plateau area of the western United States is in Colorado, Utah, northern Arizona, and northwestern New Mexico. This highland, known as the *Colorado Plateau*, ranges in altitude from 6,000 to nearly 10,000 feet. Its upper levels are forest-covered. It is occupied only by scattered white people and nomadic Indians.

The Grand Canyon. The *Grand Canyon of the Colorado*, the most wonderful river valley in the world, is noted for its scenery, especially in Arizona, where it is deepest. (See Fig. 201.) This great river valley is so broad and deep that it cannot be bridged, and consequently it offers a great barrier to trade and travel.

FIG. 201. *The Colorado Canyon from below. Note the great peaks which have resisted the action of the air and the water.*

THE BASIN RANGE AREA

Position; Surface. Lying south of the Columbia Plateau, east of the Sierra Nevada and the Cascade ranges, and extending to the Mexican line, is the region commonly known as the *Basin Range Area*. A large portion of the region was once covered by lakes, which have now disappeared and left their floors covered with a deep alluvial soil. Short, isolated, more or less parallel mountain ranges rise abruptly above the level plains of this region, giving it, in places, a mountainous appearance. (See Fig. 189.) The contrast in surface, as one passes from the Colorado Plateau region into the Basin Range Area, is very striking.

Drainage. This Basin Range region (see Fig. 191) is everywhere arid, and the larger portion of Utah and Nevada has no drainage to the ocean. The southern portion is drained by the Colorado and its tributaries. The few rivers flowing down the slopes of the ranges either dwindle away in the drier, lower lands or flow into small interior basins.

As the waters evaporate they leave behind the common salt and other substances which they have dissolved from the land. Thus the lakes have become extremely salt as the ages have gone on, like the seas of southwestern Asia. The largest lake in the Basin Range Area is Great Salt Lake. The water of this lake is so heavy because of the salt it contains that one can float in it almost like a cork.

Population; Soil. The Basin Range Area, owing to its general aridity, has a very scattered population. Its few large cities are built in the midst of fertile irrigated spots because of the possible agriculture, and near the valleys leading into the eastern mountains because these valleys offer the only direct trade routes between the Plateau States and the East.

The soil is everywhere very rich, and were water available, this area would make a magnificent agricultural region producing cereals and fruits. Grazing and agriculture are now the leading industries.

THE PACIFIC RANGES

The Valleys. The surface, climate, and vegetation of the Pacific Ranges have already been described. Lying between the ranges are the California Valley, occupied by the San Joaquin and Sacramento rivers, and the Valley of Washington, a lowland depression extending south from Puget Sound into northern Oregon. These valleys are well watered by the streams flowing out from the mountain slopes, and hence are important for their agriculture, especially where irrigation is used.

Surface. The Pacific Range region contains many high peaks and abounds in magnificent scenery. (See Fig. 202.) It lies so close to the sea that there is no coastal plain available for occupation between the highland and the sea, as there is between the Appalachian Highland and the Atlantic. This region, widely separated from the older eastern states, had but a very small white population until after the discovery of gold in California in 1849.

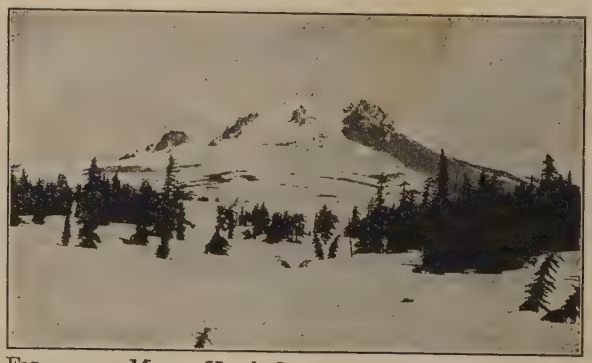


FIG. 202. *Mount Hood, Oregon, one of the highest and most majestic peaks of the Pacific states.*

Questions and Exercises

(1) Name the states and parts of states included in the prairies; in the plains. (2) From the commercial map make a list of the products of this area and state the distribution of each. (3) On an outline map of the United States locate the chief railroad centers and draw the chief land and water routes by which the products are shipped to market.

(4) Account for the paths of the railroads in the western portion of the Great Central Plain. (5) Can you explain the scarcity of railroads in Arizona and New Mexico? (6) Describe the path followed by a railroad from Seattle to San Francisco.

(7) Why would an immigrant train in the early days have had more dangers to fear crossing the plains than the Rockies? (8) Find out about some famous explorers who followed the river courses of the northern portion of the Great Central Plain. What were they seeking? (9) Why did many people in the early days of our western country go to California by water, around Cape Horn, rather than overland? (10) Where is population centered in the Rockies? (11) Name and locate these cities and tell why towns have grown up there. (12) What river valleys do the railroads across the plains follow? (13) Do they follow river valleys across the mountains? Give the reason. (14) How many transcontinental routes cross the Rockies? (15) Trace them on the map. (16) Locate the chief "parks" of Colorado; Yellowstone National Park. (17) What rivers rise in and near Yellowstone National Park? (18) To what oceans do they flow? (19) What grand scenery in the Rockies would you like to see? (20) Locate four mountain peaks in Colorado. (21) Trace the continental divide. Through what states does it pass? (22) What rivers flow through it? (23) How do the Rocky Mountains differ from the Appalachian Mountains?

(24) Which of these plateaus is of greater importance to the people of the United States? Give the reason. (25) Explain how the Colorado Canyon has been made. (26) How deep is it? (27) How wide at the top? (28) Which is more thickly populated, the Columbia or the Colorado Plateau?

(29) Draw a cross section from the Pacific to the plains and show the Coast Range, California Valley, Sierra Nevada, Basin Area, Rockies, and Great Plains. (30) Which sections are the highest? (31) Why is the section between the Sierra Nevada and Rockies called a *basin?* (32) Why are the lakes in it salt? (33) Why do some of the rivers disappear before they reach lakes? (34) Describe the surface of Nevada. (35) Where is the population centered? Why? (36) What part of the Great Basin has been made into a garden by successful irrigation?

(37) Draw a map of the California Valley and its surroundings. (38) What part of the valley is filled with water? (39) State the importance of this drowned valley. (40) Explain why the Sacramento and San Joaquin rivers receive more branches from the east than from the west.

XXVII. NEW ENGLAND

STATE	Abbreviation	Area in sq. miles	Population 1910	Chief City	Population 1910	Capital
Maine	Me.	33,040	742,371	Portland	58,571	Augusta
New Hampshire	N. H.	9,341	430,572	Manchester	70,063	Concord
Vermont	Vt.	9,564	355,956	Burlington	20,468	Montpelier
Massachusetts	Mass.	8,266	3,366,416	Boston	670,585	Boston
Rhode Island	R. I.	1,248	542,610	Providence	224,326	Providence
Connecticut	Conn.	4,965	1,114,756	New Haven	133,605	Hartford

The six states which make up New England are together about one-fourth the size of Texas, and have a population of a little over six and a half millions. This is a little less than the combined population of New York and Chicago, the two largest cities in the United States. The population of New England is centered largely about the cities in Massachusetts, Rhode Island, and Connecticut. Rhode Island and Massachusetts are the most densely populated states in the Union.

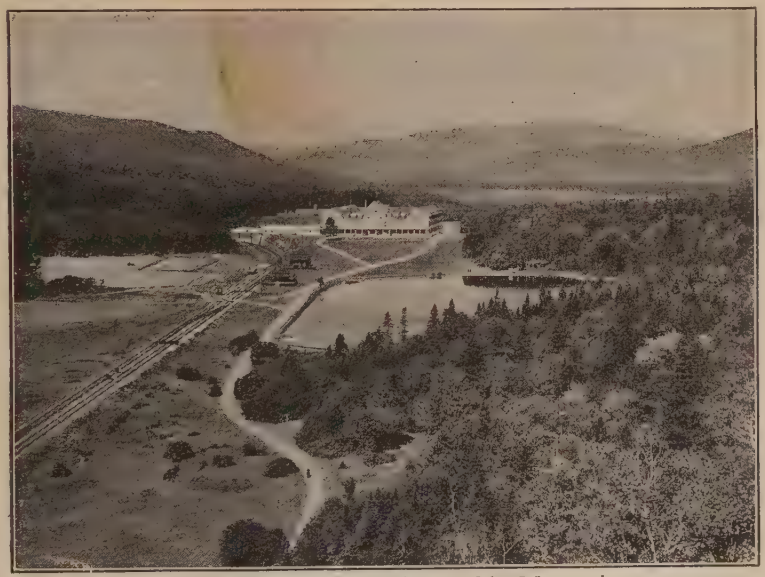
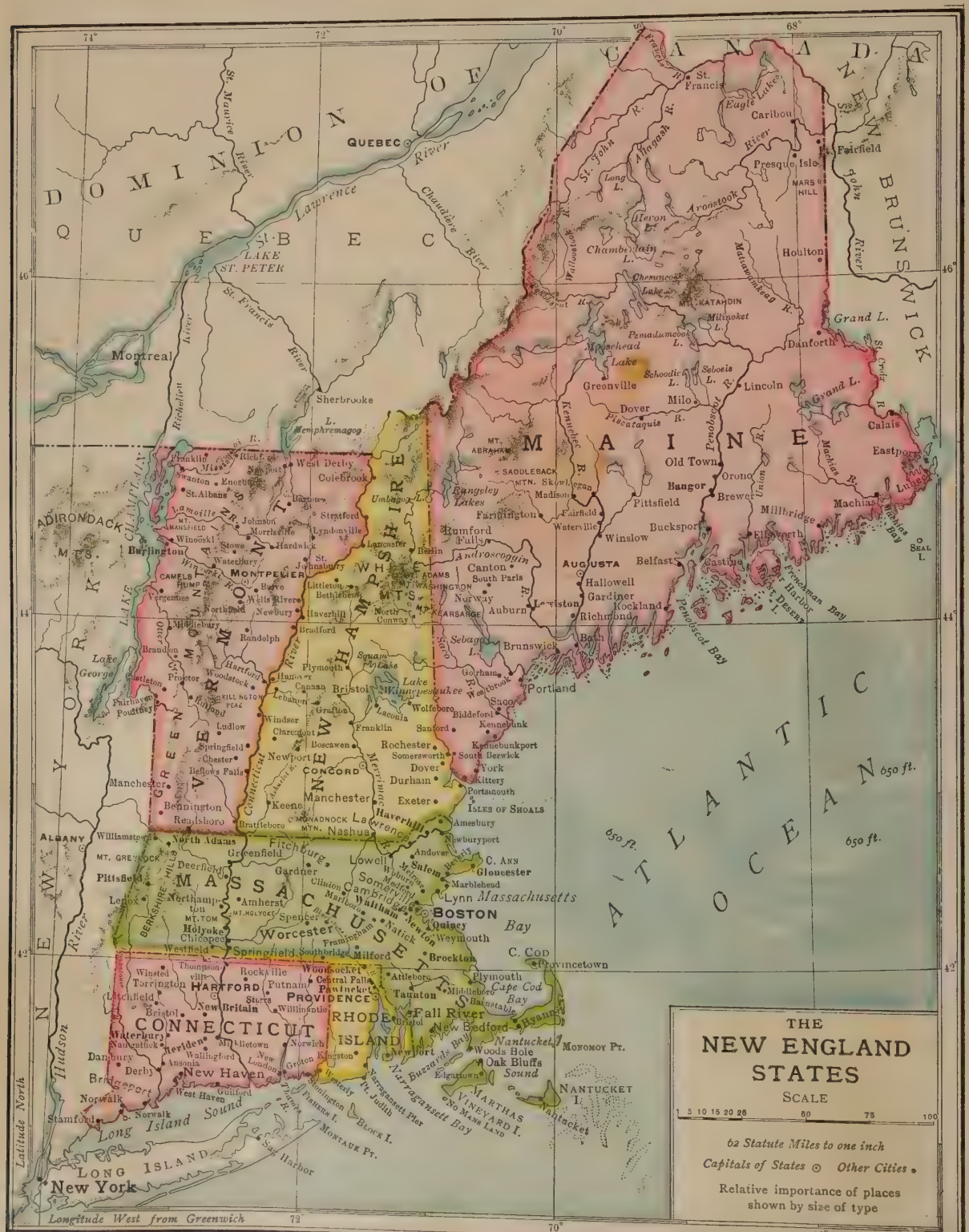


FIG. 203. *In the region of the White Mountains.*

Surface. New England is almost entirely made up of strong rocks like those forming the Appalachian Mountains. It has a diversified surface, but along the coast it is generally low, especially in the three southern states. Farther from the ocean the altitude is greater, so that a large part of New England is an upland. This upland was once a peneplain; that is, it was worn down by the action of the atmosphere and the rivers almost to the level of the sea. Later it was elevated to its present position, and the lowland became an upland. Into this upland the streams have cut narrow valleys, deeper in their upper courses than near the sea, because of the increased altitude farther from the coast. From the hilltops the even peneplain surface may be seen extending in every direction, while occasional isolated peaks or groups of peaks rise above it as monadnocks. Monadnock Mountain, Mount Greylock, the White Mountains, and many other peaks are excellent illustrations of such monadnocks. (See Fig. 203.) From the valleys these peaks seem majestic and lofty, but from the upland they appear only as slight elevations above the general level.

The strong rock ridges of New England are more or less parallel to one another and run in a general northeast-southwest direction, being parallel to the general trend of the Appalachians, with which they are connected. Hence the lowlands which have been worn into the weaker rocks are also



Revised, 1910

FIG. 204.

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parallel. This is well illustrated along the coast of Maine where the mountain ridges have been drowned. The coast line is extremely irregular and consists of a series of narrow inlets with low ridges between. The numerous small harbors afford protection to fishermen, while the narrow ridges furnish land for homes and small farms. The offshore islands are the partially-drowned outer peaks of the mountain ridges which form the peninsulas.

Soils. The whole of New England, even to the very tops of the higher mountains, was covered by the glacier which once spread over northern North America. (See Fig. 180.) The soils which formerly existed on the upland were largely removed and deposited irregularly in the lowland valleys. Since the melting of the ice sheet there has not been sufficient time for deep soils to form again on the uplands. For this reason these regions are unfavorable for agriculture, sparsely populated, and largely given up to forests or pastures. The uplands in the northern states contain many farms which have been abandoned because agriculture has failed. These farms are now being bought up as summer residences by people from the large cities, or by those who desire to devote their attention to grazing and poultry raising rather than to agriculture. The soils in the river valleys are deep and generally rich, and devoted principally to agriculture.

Along the southern and southeastern shore, particularly in Massachusetts and Rhode Island, the glacier deposited great areas of sand, so that these regions are not so fertile as the river valleys.

The glacial soils are naturally fertile when they are not sandy. They cannot always be profitably used for agriculture, however, because of the large boulders of strong rock which were plucked from the highlands and scattered so thickly over the surface as to make it difficult to till the ground. (See Fig. 206.) In certain regions these boulders have been made into stone fences or built into house walls. There are still enough of them just under-ground, however, to make it difficult to plow or harrow.

Drainage. The rivers of New England are short and navigable for only a few miles inland. Hence they have never been of great importance in commerce, except in their lower portions. The early explorers who followed the lines of the larger rivers in the hope of finding a highway to the fur-producing regions, soon discovered that these rivers gave them no access to that country. Hence their headwaters were not explored thoroughly, and no forts or trading stores were established here as along the larger rivers farther west.

At the head of navigation on the several large rivers cities have grown up. The most important of these are *Hartford* and *Norwich*, Conn., *Haverhill*, Mass., and *Lewiston*, *Augusta*, and *Bangor*, Me. The last three towns have depended largely for their growth upon the fact that the rivers on which they are situated flow through the lumbering country. They have long been the natural outlets for lumber.

The rivers of New England derive their importance from their value in manufacturing. The great glacier deposited its detritus irregularly in the valleys so that many natural dams were formed, at which the rivers now have falls. These falls furnish excellent water power, and the larger ones were early the centers about which towns sprang up. Although the water power is not sufficient for all the manufacturing and is supplemented in most of the large centers by steam power, yet about one-third of the manufacturing in this group of states is still done by water power. It is natural therefore to find many important manufacturing towns located on the rivers. *Biddeford*, Me., *Haverhill*, *Lawrence*, and

Lowell, Mass., and *Woonsocket*, R. I., are examples of such towns.

The glacier also left many depressions in which the water accumulated as lakes. From almost any high peak numerous lakes can be seen dotting the landscape and adding to its beauty. Some of these are used as reservoirs for the water supply of large cities; others, like Winnepesaukee and Sebago, have become popular summer resorts. Thousands of others have filled with detritus and vegetation and become swamps or farming land.

Scenery. Certain parts of New England are famous for their beauty. The White Mountains in New Hampshire, the Green Mountains in Vermont, and the scattered mountain peaks of Maine, Massachusetts, and northwestern Connecticut all rise sharply and in many cases majestically above the upland. Because of their altitude and summer climate, they form favorite resorts for tourists and summer visitors. The beaches, and indeed the whole shore front along the southern coast of New England, are thickly dotted with summer cottages. The scenery of New England is nowhere so grand as that of the western mountain states, but it is extremely beautiful. (See Figs. 176 and 177.)

FIG. 205. *A fisherman's house on the coast of Massachusetts.*

The northern portion of the three northern states, with their glacial lakes connected by streams and their dense forests in which game abounds, is much sought by sportsmen in the summer months. Here, as in New Brunswick and Nova Scotia, travel in the forests is still largely by canoe, as it was when the Indians occupied the region. The effect of the glaciation has been to make many long stretches in which the water moves slowly, so that canoeing, even against the current, is not difficult. The divide between one stream and another is low and narrow; thus canoes and camp equipment can be readily carried across the portage places.

Climate. New England, from its position in the northeastern part of the United States, has cold winters and warm summers. The coldest portions are, of course, in northern Maine, New Hampshire, and Vermont. In this region the snowfall is abundant. The lakes, rivers, and swamps are frozen in winter, so that people can readily move through the forests and over the land and water by means of sleds or snowshoes. At this season, therefore, lumbering is carried on, and the logs are drawn to the river banks to be floated down the streams at the time of the spring floods. During the winter the farmers throughout New England go into the forests, cut their year's wood supply, and draw it home over the snow.

The lakes and rivers are often frozen to a depth of two feet or more, and hence furnish an abundant supply of ice which is cut in large quantities and shipped to the cities along the Atlantic coast. But during the last few years this industry has declined, owing to the more general use of artificial ice which is frozen by means of ammonia. In many parts of New England the farmers cut ice in the neighboring streams and ponds

for use in summer in their households and dairies.

The rainfall in New England is more evenly distributed throughout the year than in any other part of the United States. As a result there is very little damage from drought in the summer months; the ground is so full of water that the wells rarely become dry, except in an unusual season, and the streams ordinarily furnish sufficient water to enable the mills to run throughout the year.

FIG. 206. *A rocky pasture in New England.*

Occupations. Owing to the position of New England on the seacoast, to its abundant water power, favorable climate, and diversified surface, the people are engaged in many different occupations. More than one-half of them are employed in manufacturing, and about one-eighth in agriculture. Fishing, lumbering, and quarrying are also important in certain regions where the conditions are favorable to their development. (See Fig. 205.)

Agriculture and Dairying. Owing to the varied surface and the difficulty of tilling a large area except at great cost, New England farms are generally small. The average size in all of the states except Vermont is not far from a hundred acres; in Vermont it is nearly one hundred and fifty acres. On almost any farm the surface is so irregular that different crops have to be planted in different parts and hand labor has to be employed more extensively than in the farms of the West where the level prairies can be readily tilled and the crops harvested by machinery. The most productive farms of New England are in the river valleys and on the coastal lowland. They are devoted principally to the raising of vegetables and small fruits, and to the furnishing of milk, butter, eggs, and poultry for sale in the neighboring manufacturing cities and towns.

The New England States, however, do not lead in the production of any of the important agricultural products, but Massachusetts is one of the few states of the Union in which onions are raised in large quantities, and Connecticut is one of the most important of the northern states in the production of tobacco. Potatoes are raised in large quantities in northern Maine and in Massachusetts. Hay and oats are leading crops in the cool climate and on the steeper slopes of Vermont and Maine (see Fig. 207), and more than half the cranberries of the United States are produced in the swamps of the sandy southeastern portion of Massachusetts.

FIG. 207. *Haying on a New England farm.*

In spite of the large number of people devoted to agriculture, the number engaged in manufacturing is so much greater that not enough food is raised in New England for the use of the people. Large quantities of cereals and meat have to be imported from the western states.

Forest Products. The forest products of northern New England are important, but no one of these states takes first rank in lumbering. The heavy snowfall gives easy access to the timber regions in winter, and so floods the rivers in spring that the logs can be readily floated to the sawmills in the lower valleys. (See Fig. 208.) The trees are cut either for use as lumber or for paper making. The chief timber-producing trees are the white pine and the hemlock, valuable in house building; the spruce, much used in paper making, and certain of the hard woods, especially oak, used in the manufacture of woodenware. The timber product of Maine is coming to be more and more devoted to the making of paper, and New England, to a considerable extent, is dependent for its lumber upon the forests of the western states. The logs are largely changed into finished lumber in those cities which have abundant water power and are situated at the head of navigation. *Bangor*, Me., at the falls of the Penobscot River, is such a town, and is the most important lumber market in the New England States.

FIG. 208. *A New England sawmill.*

Another forest product of considerable importance in New England is maple sugar, made from the sap of the maple trees in the more northern states, and particularly in Vermont. Vermont makes more maple sugar than any other state in the Union.

Questions and Exercises

(1) Study the surface of New England from the physical map of the United States; then color an outline map of these states showing the upland and lowland areas. (2) Draw the rivers which rise in the upland and flow across the lowland to the sea. (3) Indicate by a cross where the rivers would have falls or rapids. (4) Are such falls common or uncommon to the New England rivers? (5) What crops could be grown on a Vermont farm? (6) What western states provide lumber for New England? (7) What town in Michigan would probably furnish the interior woodwork for a house in New Hampshire? (8) Account for the number of rocks and boulders in the pastures of New England. For the number of sawmills. (9) How does Vermont maple sugar reach your home?

(10) Why is the upland surface not fitted for agriculture? (11) Name the river valleys where farming is profitable.

(12) On the outline map used in Exercise 1 locate the towns which have grown up at the head of navigation of the rivers and mark the place with an anchor. (13) Where is the population centered in Maine and New Hampshire? Give the reason. (14) Name the towns on the Connecticut and Merrimac rivers. (15) Account for the presence of so many towns on these rivers. (16) How has the fact of the glaciation of New England affected the location of towns? Of summer resorts? Of industries? (17) Tell what you can about the varied scenery of coast, upland, and mountain from a study of the pictures in this book.

XXVIII. NEW ENGLAND

(Continued)

Fishing. Owing to the excellent harbors close to the fishing grounds of the continental shelf, New England has always been noted for its fishing. Two forms of this industry are carried on—shore fishing and offshore fishing. The offshore fishing for halibut, cod, and other deep-sea fishes is the most important. This is largely centered in *Gloucester*, *Boston*, and *Provincetown*, Mass., and *Portland*, Me. Some of the fish is packed to be sold fresh, but the larger portion is salted and cured so that it is not necessary for the fishermen to reach a market until they have caught a good cargo. Hence they can take voyages of several weeks' duration.

The other form of fishing is that which is carried on near shore, particularly for mackerel, herring, and bluefish. These fish are caught mainly in the summer months by fishermen from the small ports, who get their catch to market as soon as possible. Along the shore in some places, clams, which live on the bottom, are dug and sent to the city markets. South of the peninsula of Cape Cod, oyster raising is an important occupation, some of the best oysters coming from the shores of Rhode Island and Connecticut. In the estuaries of this southern shore, scallops are caught for the winter market. Lobsters are also a valuable fish product along the coast of Maine and Massachusetts. So much fish is canned along the coast of Maine that this state ranks, next to Washington, the most important fish-canning state in the Union.

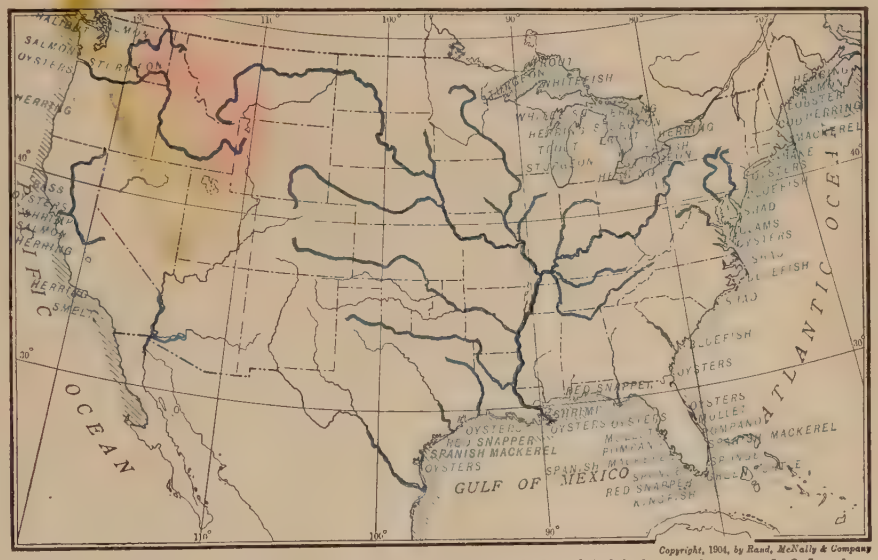

FIG. 209. *The principal interior fishing waters and the chief lake and coastal fisheries.*

Although fishing is still a leading occupation in the New England States, it is by no means as important as it was in the early history of the country when whale oil was the principal fluid used for artificial lighting, and when whaling employed a large number of vessels. At that time *New Bedford*, *Nantucket*, and *Marblehead*, Mass., were, because of their fishing, among the largest cities in the Union.

Mining and Quarrying. The strong rocks, which underlie the surface of New England, contain few mineral deposits of value, but they are exceedingly important for furnishing building and ornamental stones. Granite is quarried extensively in the northern states for building and paving stones. *Concord*, N. H., *Barre*, Vt., *Rockland*, Me., *Quincy* and *Gloucester*, Mass., and *Westerly*, R. I., are the chief granite-producing centers. The importance of the industry in all these towns, except Barre, Vt., is in part dependent upon the fact that they lie close to the sea, so that the quarry products may be easily and cheaply shipped. The quarrying of marble is carried on extensively in Vermont; *Rutland* is the chief center for this industry in the United States. Vermont also produces a large amount of slate. In the lower Connecticut Valley sandstones, which have been much used as ornamental building stones, are quarried, and the volcanic ridges near the sandstone areas are increasing in importance as sources of supply for excellent road-building material.

Manufacturing. Although more than one-half of the people in New England are engaged in manufacturing, New England produces less than fifteen per cent of the manufactured products of the United States. It is surpassed in this particular by the Middle States of the Atlantic Coast and the Northern States of the Mississippi Basin. Each of these groups of states produces manufactured

products twice as valuable as those of New England. (See Fig. 231.)

The manufacturing establishments of New England are largely in the valleys and near the ocean, where the supply of power and the opportunities for commerce make the industry most successful. Most of the raw products necessary for manufacturing have to be brought from a distance, but the advantages of cheap power and good transportation facilities so far outweigh this one disadvantage that manufacturing is constantly increasing. Because of the development of manufacturing the people have migrated in large numbers from the country regions to the towns, so that in large portions of New England, especially in the northern part, the rural population has greatly decreased in recent years.

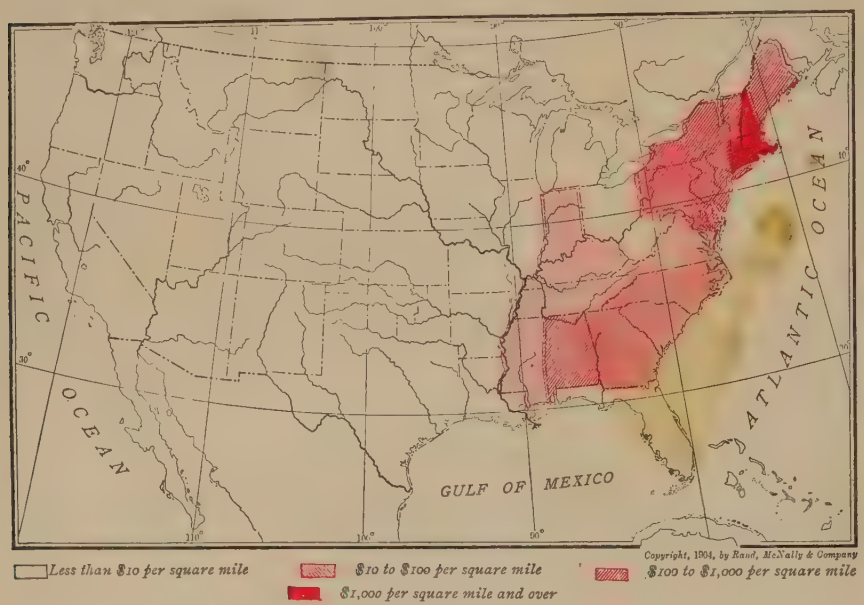

FIG. 210. *The leading cotton-manufacturing areas of the United States.*

The most important manufactures are cotton and woolen goods, leather products, machinery for cotton and woolen mills, fine tools, and delicate instruments. Massachusetts leads in the manufacture of boots and shoes, making nearly half the boots and shoes of the United States. This industry is centered largely in the three cities, *Brockton*, *Lynn*, and *Haverhill*, Mass.

Massachusetts is the first cotton-manufacturing state in the Union. (See Fig. 211.) It imports the raw cotton mostly from the southern states. *Fall River*, Mass., is the most important cotton-manufacturing city in the United States. *Lowell*, *New Bedford*, and *Lawrence*, Mass., and *Manchester*, N. H., are also centers for this industry.

Massachusetts is also the first state in the manufacture of woolens and woolen goods. (See (Figs. 212 and 213.) Lowell, next to Philadelphia, is the leading woolen manufacturing city in the country. *Lawrence*, *Lowell*, and *Fitchburg*, Mass., and other smaller towns turn out so large a product of woolens and textiles that the value of these goods in Massachusetts exceeds that of Pennsylvania, the second state in the value of woolen manufactures, by many millions of dollars annually.

Rhode Island is the leading state in the manufacturing of jewelry. This industry centers in *Providence*, which makes more than a quarter of the jewelry of the whole country. The neighboring cities of *Attleboro* and *North Attleboro*, Mass., are also important for their jewelry. Many of the towns of Connecticut,

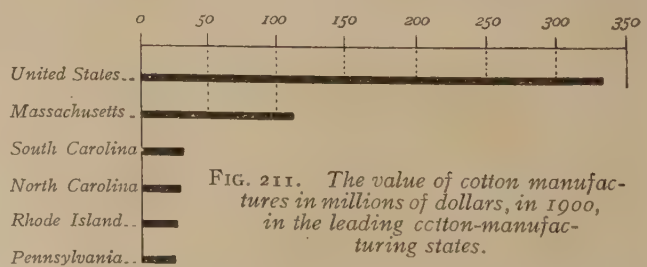

FIG. 211. *The value of cotton manufactures in millions of dollars, in 1900, in the leading cotton-manufacturing states.*

like *Meriden* and *Waterbury*, lead in the production of plated silverware and brass work, and *Waltham*, Mass., is noted the world over for its fine watches.

Massachusetts is the second and Maine the third state in the Union in the production of paper. The paper mills are largely situated upon the headwaters of streams, like the Connecticut, the Androscoggin, and the Kennebec, where the abundance of water power and the nearness of the forests make this industry particularly successful. The largest paper-making city, however, is *Holyoke*, Mass., where the abundant water power of the Connecticut River is utilized for this purpose. The finer grades of paper are made here, largely from rags rather than wood pulp.

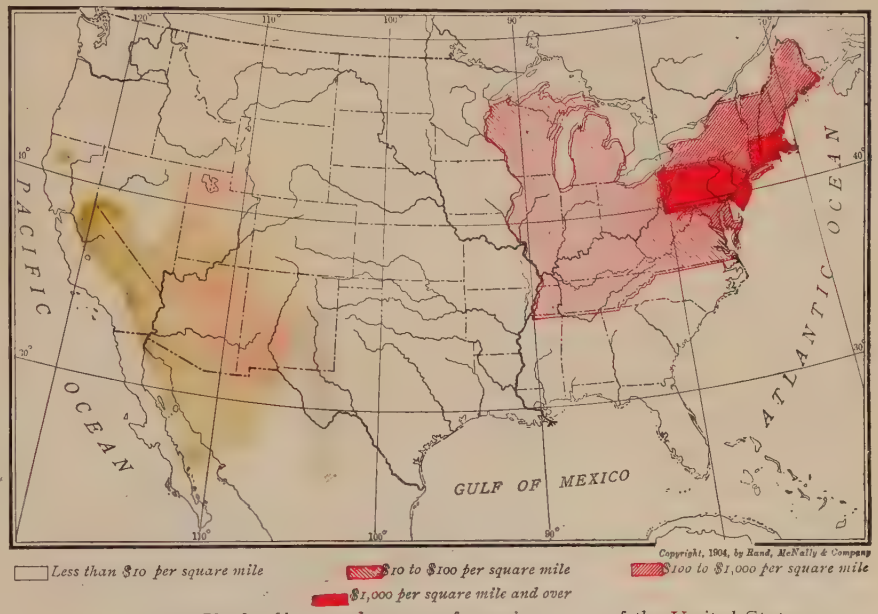

FIG. 212. *The leading woolen-manufacturing areas of the United States.*

Trade and Cities. Owing to the large and commodious harbors possessed by all the states of New England except Vermont, foreign and coastwise commerce is easily carried on and is very important. The chief commercial city is *Boston*, Mass., which, next to New York and Galveston, is the most important port in the United States. *Portland*, Me., is also a large and growing port because it has a fine harbor and excellent railroad connections with the large cities of Canada. It receives from Canada a great quantity of products for exportation during the winter months when the St. Lawrence is frozen. It also is the natural outlet for the manufactures of Biddeford, Saco, Lewiston, and the other neighboring manufacturing cities.

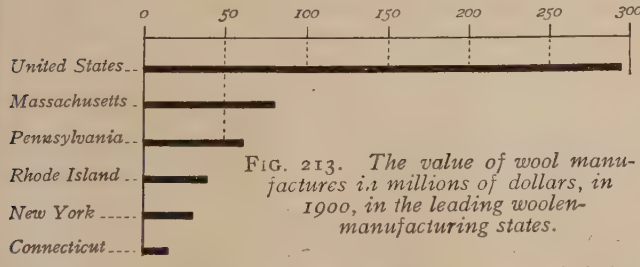

FIG. 213. *The value of wool manufactures in millions of dollars, in 1900, in the leading woolen-manufacturing states.*

Southern New England is covered by a close network of railroads connecting the manufacturing cities with the ports. The railroads carry an enormous amount of freight to the ports, and also bring large quantities of food and raw products from the South and the West.

Boston, the principal wool market of the country, exports food products to Europe, and has an extensive coastwise commerce with New York, Savannah, and the West Indies. It is the financial center of New England, and the first city in the Union for the exportation of leather and leather goods. It is situated on a fine harbor (see Fig. 214) and is surrounded by many cities, more than twenty of which are within an hour's ride by rail. The neighboring cities are nearly all important in some line of

manufacturing, and many of them are the homes of the business men of Boston.

Boston is connected with the large cities of central Massachusetts and the West by two railroads, which bring a great quantity of cereals and provisions to its ports. It is famous for its magnificent system of parks, for its many fine public buildings, and for its educational and charitable institutions. It is a center of great historic interest, especially because of the stirring events of the Revolutionary War which took place in the city or in the surrounding towns. *Cambridge*, Mass., is noted as being the location of Harvard University, the oldest and largest university in the country.

The second city in size in New England is *Providence*, R. I. Providence is a large manufacturing city with an extensive coastwise trade on account of its position on the Providence River. *Worcester*, Mass., the third city in New England in size, is located in the center of a large manufacturing area, and has excellent railroad connection with Boston, Providence, and the West. *Hartford*, Conn., *Holyoke*, *Springfield*, and *Chicopee*, Mass., are the leading manufacturing cities in the Connecticut Valley. Springfield, the junction of railroads from the east, the west, the north, and the south, is the railway center of western New England.

The largest city of Vermont is *Burlington*, on Lake Champlain. Owing to its position on the lake, it is an important trade center for the region round about, especially for lumber brought from Canada. New Hampshire has four important cities: *Concord*, *Manchester*, *Nashua*, and *Portsmouth*. Concord, the capital, is the center for the granite industry; Manchester and Nashua are large manufacturing cities; Portsmouth has a good harbor and a large navy yard.

Connecticut has two large cities and several smaller ones. *Hartford*, the capital, situated at the head of navigation on the Connecticut River, is the center of trade for the smaller manufacturing places of the Connecticut Valley, and has valuable manufactures of machinery and bicycles. The largest city of Connecticut is *New Haven*. New Haven has an excellent harbor and is at the junction of three railroads from Boston, each of which passes through many manufacturing towns. It is therefore well placed for coastwise trade. The manufacture of clocks, firearms, and locks is the leading local industry. Yale University, one of the oldest and most renowned universities of the country, is located here. All the larger coast towns of Connecticut are connected with New York by daily steamers, and can thus readily ship the products of the interior towns to this great commercial center.

FIG. 214. *Boston Harbor. Notice the "fishing smack," as the small sailing vessels which are used for fishing on the Grand Banks are called.*

Questions and Exercises

(1) How does the climate of Maine favor lumbering? (2) How does the climate of New England favor agriculture? (3) What fruits can grow there? What fruits must be imported? (4) What are the occupations along the coast? In the river valleys? In the upland regions? (5) Why are the farms so small? (6) Name the fish caught off the shores. (7) Make a list of the raw materials sent into New England to be manufactured. (8) Where do they come from and to what towns is the finished product sent? (9) On an outline map of New England locate the chief manufacturing towns.

XXIX. MIDDLE STATES OF THE ATLANTIC COAST

STATE	Abbreviation	Area in sq. miles	Population 1910	Chief City	Population 1910	Capital
New York	N. Y.	49,204	9,113,614	New York	4,766,883	Albany
Pennsylvania	Pa.	45,126	7,665,111	Philadelphia	1,549,008	Harrisburg
New Jersey	N. J.	8,224	2,537,167	Newark	347,469	Trenton
Delaware	Del.	2,370	202,322	Wilmington	87,411	Dover
Maryland	Md.	12,327	1,294,450	Baltimore	558,485	Annapolis
Virginia	Va.	42,627	2,061,612	Richmond	127,628	Richmond
District of Columbia	D. C.	70	331,069	Washington	331,069	

Size and Soil. The Middle States of the Atlantic Coast, extending from Canada on the north to North Carolina on the south, have together an area about twice that of New England. This group of states includes parts of the Atlantic Coastal Plain, the Piedmont Belt, and the several divisions of the Appalachian Highland, which have already been described. (See Fig. 191.) Nearly the whole of New York, and the northern portions of Pennsylvania and New Jersey, were covered by the continental glacier. (See Fig. 180.) Hence the streams abound in falls, lakes are numerous, and the upland soils are thin. In the valleys the glacial soils are deep and generally fertile. (See Fig. 197.) In the region which was not glaciated soils like the underlying rock are found, as they are throughout the southern states.

Climate. Owing to the location of the Middle States of the Atlantic Coast on the easterly side of the continent, the climate is very changeable, but is everywhere moist. There is a wide range of temperature between the summer and the winter, and in winter the changes are rapid and often severe. In the higher Adirondacks the temperature is far below the freezing point during the larger part of the winter, while in southern Virginia extremely low temperatures are rarely recorded for more than two or three days at a time.

The summer climate is generally warm and moist. In the higher mountains like the Adirondacks, the mountains of Pennsylvania, of eastern New York, and of western Virginia and Maryland cooler temperatures prevail at night. These regions have therefore become favorite summer resorts.

About New York City and in the lowland which lies to the east of Lake Erie, fogs are very dense during a large part of the winter months. In western New York the fogs are due to the condensation of the moisture brought by the warm air from the lakes to the cooler surface of the land. The fogs around New York City are formed by the chilling of the moisture brought from the sea. These fogs are often so dense as to interfere seriously with navigation. There are occasional days when no vessels can enter or leave New York Harbor on account of the fog.

THE COASTAL PLAIN

The coastal plain extends from New York southward and as far inland as the Fall Line. (See Fig. 191.)

Agriculture. The fine, rich soils, the early spring and late autumn, the abundant water supply brought down by the rivers, all favor the development of agriculture in the coastal plain. The network of railways connecting the interior with the great cities along the coast afford quick transportation. These cities, together with the manufacturing towns that have grown up along the Fall Line, furnish a ready market for everything that is raised. Therefore throughout this region

FIG. 215.

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early spring vegetables and potatoes, tomatoes and beans, fruits, such as grapes, peaches, strawberries, and cantaloupes, are grown in large quantities, and are either shipped by rail or by water to New York and the other large northern markets. Peanuts are raised in large portions of the coastal plain of Virginia, which leads all the states in the Union in this branch of agriculture. (See Fig. 216.)

Fishing. The rivers and estuaries of the coastal plain area are not only important as routes for commerce, but also for their fishing, particularly oyster fishing. (See Fig. 209.) Oysters require clear, warm, shallow water into which a steady supply of fresh water is running all the time so as to make it brackish. These conditions are all furnished in *Chesapeake Bay*, which receives the drainage of many large river basins. Hence this bay is the great center for oyster fishing, and *Baltimore*, Md., is the chief city in the country for the canning of oysters.

Mineral Products. The rocks of the coastal plain are valuable. Some of the clays are particularly adapted to the making of pottery, drain pipes, and light-colored bricks. *Trenton*, N. J., close to abundant supplies of pottery clay, is the most important pottery-making city in the Union, but secures its finer clays from a distance. *Perth Amboy*, N. J., at the northern extremity of the coastal plain, makes light-colored bricks, largely used for ornamental purposes in buildings. (See Fig. 217.) Certain rock layers of the coastal plain also supply glass sands for the making of glass.

FIG. 216. *Peanut raising in Virginia.*

FIG. 217. *Towing Perth Amboy bricks into New York Harbor.*

THE PIEDMONT BELT

Beginning at the Fall Line, which forms the western boundary of the Atlantic Coastal Plain, and extending to the Allegheny Mountains, is the Piedmont Belt. (See Fig. 191.)

Agriculture. The Piedmont Belt, with its rolling surface and fine lowland soils, is, next to the coastal plain, the great agricultural portion of the Middle States of the Atlantic Coast. All parts of this belt have excellent railroad connections with the large cities, and therefore the agricultural products may be readily carried to market. (See Fig. 218.)

In the northern portion of the belt, particularly in New Jersey, most of the farmers are engaged in truck farming, that is, the raising of vegetables and fruit for immediate use in the neighboring cities. In Virginia the Piedmont Belt is the tobacco-growing area. *Lynchburg* and *Danville* are in the midst of the tobacco-producing country; *Richmond* is the second largest tobacco market in the United States.

Cities. The Piedmont Belt in New Jersey, being separated from New York City only by

FIG. 218. *One of the many splendidly equipped express trains run over the Piedmont Belt.*

the Hudson River, and sharing with New York City the advantages of the Hudson as a harbor and a commercial route, contains many large cities. The most important are *Newark*, *Jersey City*, and *Hoboken*. These cities, together with the neighboring towns, are the residences of thousands of business men who go back and forth to their offices in New York City every day. The same is true of the towns about Philadelphia.

THE APPALACHIAN MOUNTAINS

The Appalachian Mountains extend southwestward from New England throughout the Middle States of the Atlantic Coast. (See Fig. 191.) In New Jersey and southeastern New York they form a barrier, broken only by the water gaps of the several streams. In Pennsylvania they are so disconnected that they hardly form a continuous range, while in Virginia they are more continuous and are known as the Blue Ridge; so named because the mountains, clothed in haze, looked blue to the early settlers in the Piedmont Belt. Although the Blue Ridge is broken by few streams that offer water gaps for railroads, it contains many passes, which are of some importance as routes of travel between the eastern and western portions of Virginia. Throughout their extent in the Middle States of the Atlantic Coast the Appalachian Mountains are generally forest-covered, and where their slopes are rugged and precipitous they are noted for their scenery.

The Water Gap of the Hudson River. The most important of the water gaps through the Appalachian Mountains is that of the Hudson River. The Hudson River is a tidal estuary as far north as Troy, or for a distance of about one hundred and fifty miles. Its western branch, the Mohawk, and the lowlands south of Lake Ontario together form a great

FIG. 219. *Looking up the Hudson from New York City.*

FIG. 220. *The Erie Canal at Syracuse.*

highway, with gentle grades connecting the Hudson Valley and the Great Lakes and making it possible to transport goods by this route from Buffalo and the West to New York with ease. Hence the Hudson Valley may well be called the Gateway of the American Continent. The water gap through the highlands of the Hudson is the narrowest and most important portion of this gateway. Through it pass two railroads, one on each side of the river. In the summer season the Hudson River is also an important route for water commerce. No one of the other rivers crossing the Appalachian Mountains is a water route, save for short distances where canals have been built.

The Susquehanna Valley. The Susquehanna Valley is the route of the second great railroad from Philadelphia and New York westward. This road, however, had to be built over high altitudes and is therefore more expensive to operate than the railroads which follow the Hudson River Valley.

THE GREAT VALLEY

The Great Valley is a trough lying just west of the Appalachian Mountains. It is not so [illegible] so well defined in New York as it is in the states farther south.

The Great Valley in New York. In New York the Great Valley is mainly of importance as a route of travel and transportation, inasmuch as it is narrow and contains the upper Hudson and Lake Champlain.

The lowland containing the Mohawk and the plains along Lake Ontario is the western branch of the Great Valley. It is a good farming area, especially for hops, potatoes, and hay. (Figs. 270 and 271.) The slopes here are so gentle that it was easy to build the Erie Canal, which connects the Hudson River with Lake Erie. Before railroads came this canal was of vast importance, and along it have grown up cities like *Rochester*, *Syracuse*, and *Utica*. (Fig. 220.) These towns have developed not only because of the canal, but also because they are agricultural or manufacturing centers. The chief cities of the Hudson Valley are *Albany*, the capital of New York, *Yonkers*, and *Troy*, the first city in the Union in the manufacture of collars and cuffs.

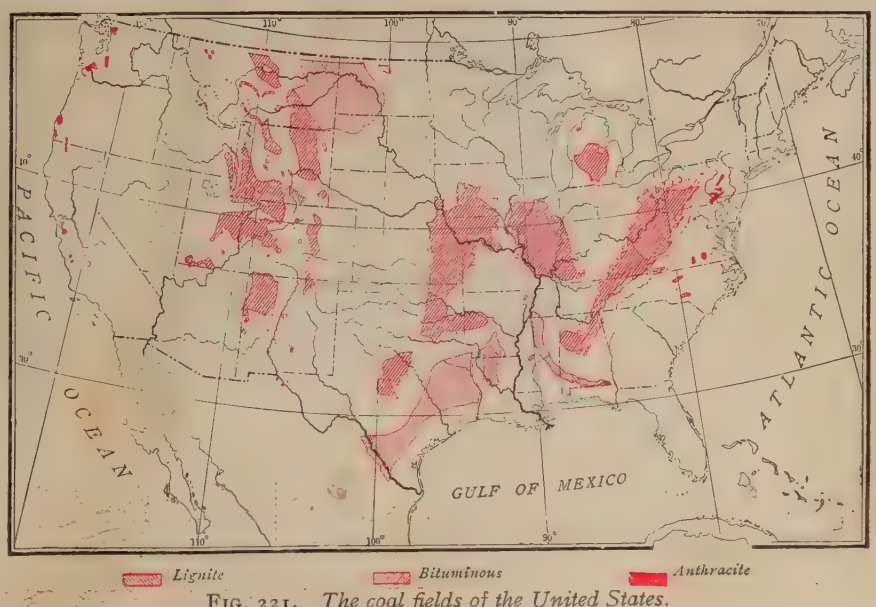

FIG. 221. *The coal fields of the United States.*

The Great Valley in Pennsylvania. In Pennsylvania the even surface of the Great Valley is broken by a number of ridges rising almost to the height of the Allegheny Plateau, and formed of the same kind of rock. These ridges are rich in anthracite, or hard coal, and in iron. Pennsylvania produces all the hard coal of the United States. In this section, coal, iron, and limestone used to purify iron, exist close together. Hence iron and steel manufacturing have become great industries. *Scranton*, *Wilkes-Barre*, *Shamokin*, and *Pottsville* are important coal-mining centers. *Easton* and *Allentown* are among the leading steel-making towns of the country.

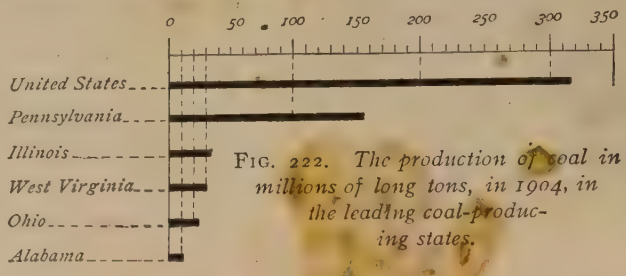

FIG. 222. *The production of coal in millions of long tons, in 1904, in the leading coal-producing states.*

The Great Valley in Virginia. In Virginia the Great Valley includes the famous Shenandoah Valley, noted for its richness and beauty, and of great historic interest because of its importance in the campaigns of the Civil War. Cattle, horses, and sheep are raised in the southwestern section, and agriculture is carried on with success throughout the area. The minerals of this region, particularly in the south, are sufficiently valuable to cause the rapid development of iron, steel, and zinc works at *Pulaski* and *Roanoke*. The neighboring forests furnish a supply of hardwoods, like walnut and oak, which are used extensively in the manufacture of furniture in the valley cities of Virginia.

The Shenandoah Valley is a natural highway, and is therefore the route of a trunk line of railroad from Philadelphia and Harrisburg to Chattanooga and the South. It is also crossed by one of the great coal-carrying railroads of the country, connecting the West Virginia coal fields with Norfolk, which is one of the leading coal ports of the United States.

FIG. 223. *A summer scene in the Adirondack Mountains.*

THE ADIRONDACK MOUNTAINS

Lying between the two northern forks of the Great Valley is an area made up of strong rocks like those of New England. It is known as the Adirondack Mountains. This highland, together with the lower rolling country stretching westward to the Great Lakes, is largely forest-covered and noted for its scenery. (See Figs. 191 and 223.) The high, rugged mountains, the beautiful, wooded slopes, and the picturesque lakes, occurring singly or in chains, make the region particularly attractive to tourists in the summer months. Owing to the bracing atmosphere and the delightful climate, the Adirondack Mountains have also become a favorite health resort, especially for people who are afflicted with diseases of the lungs.

Manufacturing. The Adirondack Mountains furnish water for rivers flowing to the St. Lawrence, the Hudson, and Lake Champlain. The forests supply wood for pulp. Therefore on the headwaters of the Hudson and on the western slopes of the highland paper-making flourishes. New York leads the country in this industry. *Glens Falls* is the most important paper-making city in the state.

Dairying. The western portion of this area, bordering the St. Lawrence and Lake Ontario, and extending southward to the Mohawk Valley, is a great grazing country, in which the milk is largely made into butter and cheese, as it is across the river in Canada. Owing to the distance from a good market and the poor shipping facilities to the great cities, it is impossible to sell the milk profitably, hence the rapid development of the butter and cheese industry. New York is now the first state in the Union in dairy products. (See Figs. 224 and 225.)

Cities. The eastern towns of this area, on the shore of Lake Champlain, are centers for lake commerce. They are also points of departure for people entering the Adirondacks. The chief town in this region is *Plattsburg*, a port on Lake Champlain, from which many summer tourists leave for Canadian camping expeditions. *Saratoga* is situated in a region abounding in mineral springs, and has become a famous summer resort to which thousands of people go each year.

The leading towns of the western portion are *Ogdensburg*, dependent for growth largely upon its position on the St. Lawrence; *Watertown*, a manufacturing center, power for which is furnished by the Black River, and *Clayton*, at which visitors for the beautiful Thousand Islands leave the railroad.

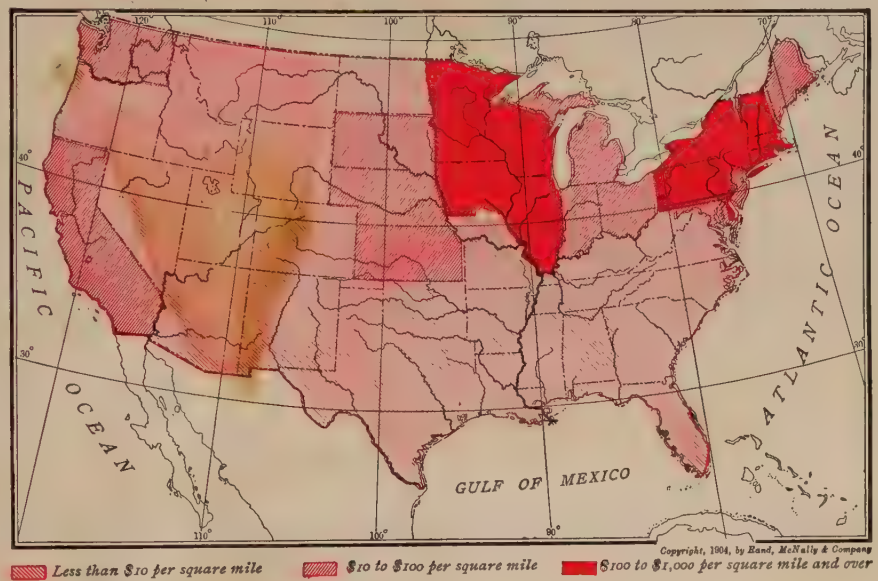

FIG. 224. *The areas of the United States devoted to dairying.*

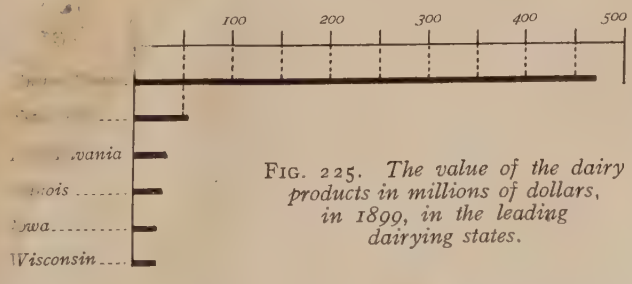

FIG. 225. *The value of the dairy products in millions of dollars, in 1899, in the leading dairying states.*

Questions and Exercises

(1) How are the boundaries of New York state advantageous? (2) Compare Pennsylvania with New York in this respect. (3) Compare the surfaces of New York and Pennsylvania. (4) Which has the most favorable surface for the development of varied occupations?

(5) What do you understand by the name "Water Gap" as applied to the Delaware River? (6) Find other similar gaps in the Middle States of the Atlantic Coast. (7) Trace a railroad through the Hudson Valley and Gap to Buffalo. (8) Locate the chief cities on this road. (9) Why have so many sprung up here? (10) Why is this valley so important? (11) What advantages does a railroad in this valley have over that in the Susquehanna Valley? (12) What rivers make gaps in the Blue Ridge? Trace the railroad routes which cross the mountains through these gaps. (13) Locate the chief coal fields of these states. (14) Why should iron and steel manufacturing have developed near these fields? (15) How is coal from Pennsylvania sent to Boston? (16) Draw a map of Pennsylvania showing the coal and iron producing areas. Locate the mining and steel-making towns.

FIG. 226. *Oil wells in western Pennsylvania.*

XXX. MIDDLE STATES OF THE ATLANTIC COAST (*Continued*)

THE ALLEGHENY PLATEAU

The Allegheny Plateau occupies all of that portion of the Middle States of the Atlantic Coast west of the Great Valley and south of the Mohawk River. (See Fig. 191.) It includes a small part of West Virginia and Maryland and a large part of western Pennsylvania and southern and western New York, and ends in the Catskill Mountains. This plateau is everywhere more than a thousand feet in height and forms the center from which radiate streams to the Great Lakes, to the Atlantic, and to the Ohio.

Dairying. Owing to the altitude, the damp climate, and to the slopes which are available for grazing, large portions of the Allegheny Plateau are devoted to dairying. In the eastern portion the dairy products are largely sent to New York City in the form of milk. In the region to the west, which is farther from the eastern markets, the milk is made into butter and cheese, as it is in the Adirondacks.

Agriculture. The agricultural products of the Allegheny Plateau include potatoes, beans, and sugar beets. New York is the second state in the production of beans, and the sugar-beet industry is developing rapidly. Owing to the damp, cool climate, rye is an important cereal in this region; Pennsylvania is the first state in production. In the lowland bordering Lake Erie and Lake Ontario and bounded on the south by the plateau, grapes and other fruits flourish. Spring and autumn are both late. Hence grapes do not start too early in the spring and ripen before frost. New York, second only to California in value of fruit products, is also second to that state in grape culture. It ranks first in the raising of apples, and Pennsylvania second. (See Fig. 295.)

Mineral Products. The wealth of the Allegheny Plateau lies in the rocks, which contain coal, gas, and oil. The rocks are nearly horizontal, and are but little broken. Hence the gas and oil are held until an opening is made through which they can reach the surface. (See Fig. 226.) Salt also occurs here.

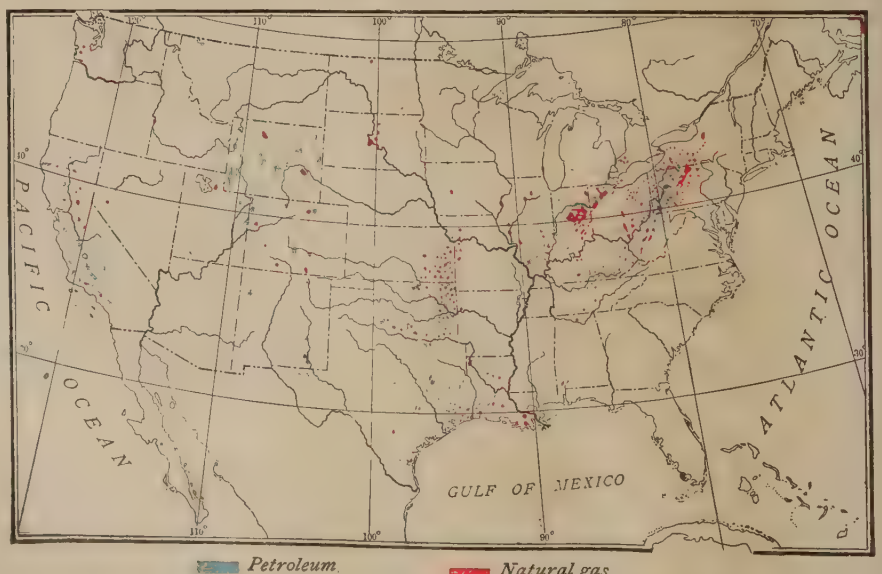

FIG. 227. *The gas and petroleum fields of the United States.*

FIG. 228. *A general view of Pittsburg. Notice the many facilities for carrying on commerce.*

Western Pennsylvania produces a large quantity of bituminous coal. This, added to the vast amounts of anthracite mined in the ridges of the Great Valley, makes Pennsylvania the chief coal-producing state in the Union. (See Fig. 222.) It also leads in the production of natural gas and coke. The coke is used in the smelting of iron brought from Michigan and Minnesota, and as a result western Pennsylvania is the greatest iron and steel producing region of the United States. The iron ore is brought from the Lake Superior region as it has been found much cheaper to transport the ore down the lakes to the coal than to carry the coal to the ore. Pennsylvania produces more than one-half of all the iron and steel manufactured in the United States. The most important steel cities are *Pittsburg*, which produces more than ten per cent of all the iron and steel manufactured in the country, *McKeesport*, and *Johnstown*. Pittsburg is also the chief glass-making city of the country. The success of this industry is due to the supply of natural gas, which affords the best heat for glass blowing. *Connellsville* is the leading coke center of the country. Coke is made by burning coal so as to drive off the gas. Pennsylvania and New York also produce petroleum and in the production of salt New York leads the country.

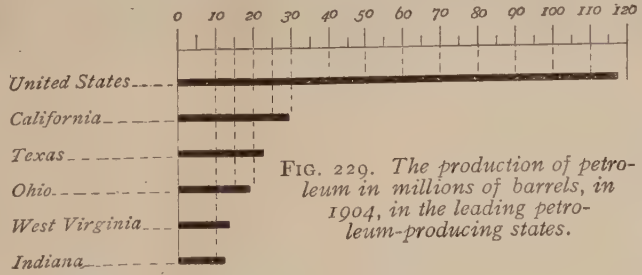

FIG. 229. *The production of petroleum in millions of barrels, in 1904, in the leading petroleum-producing states.*

Cities. On the coast of Lake Erie there are two large cities, dependent in part upon their proximity to the coal fields of Pennsylvania, and in part upon their favorable position on the Great Lakes, down which comes the iron ore. The chief city is *Buffalo*, the second largest city of New York. It is connected with New York City by many railroad lines, and by the water route afforded by the Erie Canal and the Hudson River. It is also the most eastern

port of the United States having continuous water connection with the upper lake ports. Through it passes an enormous quantity of lumber, grain, iron ore, and live stock in transit from the West to the eastern seaports and Europe. Owing to the ease with which raw materials can be secured, Buffalo has become one of the important cities of the country in the manufacture of pig iron, cars, and flour.

Erie, Pa., with a fine natural harbor, has a large trade in coal and petroleum carried from Pennsylvania westward, and in iron and lumber brought from the upper lake ports to Pennsylvania. Like Buffalo, it has found it easy to secure raw materials and has therefore developed into a leading manufacturing city.

Scenery and Resorts. The more rugged portions of both the Adirondack and the Catskill mountains are much visited in summer. The fishing and hunting to be found in the forests attract sportsmen, and the mountain air is sought by invalids.

FIG. 230. *The rapids below Niagara Falls.*

The most famous natural feature of the western portion of New York state is *Niagara Falls*, formed where the waters of the upper Great Lakes descend over one of the bordering cliffs of the Allegheny Plateau on its way into the Lake Ontario lowland. A great mass of water falls a distance of one hundred and sixty feet in two portions, known as the American and the Canadian falls. These falls are not the highest or the widest known in the world, but they have a greater volume of water than any other falls and are remarkably beautiful. They are visited by great numbers of people each year, and are one of the most noted scenic features of America. A small portion of the water is now being used to develop electricity which is carried to Buffalo, N. Y., for use in lighting and power. (See Fig. 230.)

Along the barrier beaches that border the shore of New Jersey are many famous summer resorts. The best known are *Atlantic City* and *Ocean Grove*.

Trade and Cities. *New York* is the most important city in America for its foreign trade. (See Fig. 219.) It is situated on a magnificent harbor at the mouth of the Hudson River, and is connected by railroads and by water with the manufacturing cities of New England. From it railroads radiate along all the natural highways toward the western and southern states, and the Hudson River and the Erie Canal furnish a water route to the Great Lakes. New York, by reason of its location, has long been the largest city and the most important port in the country. It is also the second largest city in the world.

The original city of New York is located on a long, narrow island, hemmed in between the Hudson River and Long Island Sound. To this area Brooklyn on Long Island and the whole of Staten Island to the south have been added within a few years. It has over three hundred

miles of wharfage and shore line, and is connected by many steamship lines, not only with other ports up and down the Atlantic coast, but with all the leading ports of Europe, South America, and the West Indies. More than fifty ocean steamers engaged in foreign trade leave its docks weekly. Through it pass enormous quantities of foods, including breadstuffs and animal products from the West, cotton from the South, and petroleum from the West, in transit to foreign ports. Its imports are equally large, and include raw and finished products from all parts of the world. It is the financial center of the United States, and therefore has countless business offices, banks, and large exporting houses, concentrated for the most part in the southern portion of the island on which the main part of New York is built. (See Fig. 232.)

Not only is it a commercial and financial center, but it is the chief manufacturing city of the country, particularly for the making of clothing, the publishing of books, and for planing-mill work. *Brooklyn*, which is now a part of New York, is the leading city in the country for the refining of sugar.

FIG. 232. *New York along Broadway.*

New York contains several important educational institutions, a number of large hospitals, and many charitable institutions. It has magnificent museums and beautiful parks and streets. Broadway, the principal street, is one of the busiest thoroughfares in the world.

Owing to the fact that many people desire to do business in a small area, the larger office buildings are twelve to twenty stories in height, and some of them accommodate several thousand people. For the same reason the houses in which people live are generally not single dwellings, but are

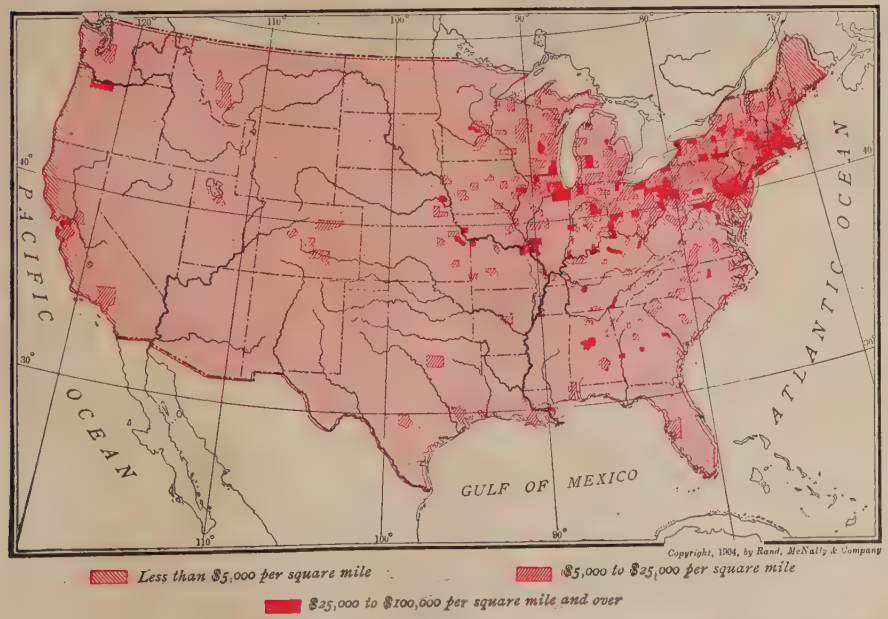

FIG. 231. *The value of manufactured products per square mile in the United States.*

built to accommodate many families, each family having a series of rooms on one floor. Owing to the large number of people crowded together in a small area, the population is very dense in New York; in some parts denser than in any other place, with the possible exception of certain parts of London.

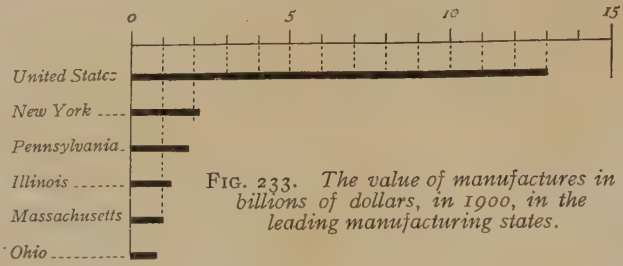

FIG. 233. *The value of manufactures in billions of dollars, in 1900, in the leading manufacturing states.*

Philadelphia, Pa., is the third largest city in the United States and the fifth seaport in importance. It is situated practically at the head of navigation on the Delaware River, and with excellent railway connections with the iron and coal producing regions, its opportunities for commerce are excellent. It is a great coal-exporting city, particularly to the towns along the coast, and has several lines of foreign vessels. Because of its situation, it is an important manufacturing place, especially for carpets and rugs, woolen and worsted goods, and finished leather, in the making of which it surpasses all other cities in the country. It is also noted for its foundry and machine shop products, especially locomotives and cars.

FIG. 234. *The Capitol Building at Washington.*

Philadelphia contains many buildings that are of great historic interest. The most historic is Independence Hall, in which the Declaration of Independence was signed in 1776, and where the Liberty Bell is now preserved.

Philadelphia was the first city in this country to be laid out in blocks so that the streets and avenues cross at right angles. This arrangement was due to William Penn, the founder of the city. William Penn's old home is still preserved in Fairmount Park.

Philadelphia is the business center for a number of large suburban places, of which *Camden*, N. J., across the Delaware River, is the most important. All of these cities or towns have grown up with Philadelphia, and are as closely connected with it as the suburbs of New York and other large centers are with those cities.

Baltimore, Md., a growing and active city favorably situated on the Fall Line near the head of Chesapeake Bay, is coming to be a leading commercial center, and is the sixth seaport in importance. It is an important manufacturing city, especially for its ready-made clothing, its canning of fruits, vegetables, and oysters, and its tobacco products.

It is beautifully situated on a series of heights rising above the Piedmont lowland. It has excellent railroad connections with the North and the South, and with the West. The railroad to the West, however, has to follow more difficult grades than the western roads centering at Philadelphia and New York. Hence Baltimore is at a disadvantage

in securing trade with the regions lying to the west of the Appalachian Highland.

DISTRICT OF COLUMBIA

The District of Columbia, with an area of seventy square miles, was laid out as a Federal District to contain the capital of the United States when the great western territory was little known, and when it was not expected that some day the United States would stretch from sea to sea.

FIG. 235. *The Congressional Library at Washington.*

The Capital. The city of *Washington*, which lies in the District of Columbia, is beautifully laid out. As the capital of the United States it contains the great Capitol Building with its impressive dome (see Fig. 234), the White House, the home of the President (see Fig. 236), and many large and beautiful public buildings in which the national business is conducted. Most of these buildings are visited annually by thousands of people from every part of the country. The most beautiful buildings are the Library of Congress (see Fig. 235) and the new Pension Building. The great monument to President Washington, 555 feet high, affords a fine view of the city, which rises from the quiet Potomac in a series of terraces.

Washington is not a port of importance, but it has daily steamboat connection with Norfolk, Va., and is the point from which visitors take boat or car for Mount Vernon, the fine old colonial home of President Washington, a few miles down the river.

FIG. 236. *The White House, the home of the President.*

Questions and Exercises

(1) Give the chief reasons why New York has outgrown Philadelphia in importance. (2) Give the reasons for the location of Buffalo, Baltimore, Pittsburg, Trenton, and Scranton. (3) Make a list of the products which are dependent on the climate; those that are dependent chiefly on the surface. (4) Draw diagrams showing the location and commerce of Buffalo, Pittsburg, and New York City, and show their connection by railroads with the larger cities of this section. (5) Name the chief imports of New York City; its chief exports. (6) Why should Philadelphia be an important manufacturing city? (7) What advantages in securing western trade has New York over Baltimore? (8) What advantage has Baltimore over New York? (9) Name the chief places in these states noted for their scenic beauty. Describe any one you have seen or of which you have seen pictures. (10) Name the chief places in these states noted for their historic associations. Describe any of these places you have visited or seen pictures of. (11) Why was the city of Washington located where it is?

XXXI. SOUTHERN STATES OF THE ATLANTIC COAST

STATE	Abbreviation	Area in sq. miles	Population 1910	Chief City	Population 1910	Capital
North Carolina	N. C.	52,426	2,206,287	Charlotte	34,014	Raleigh
South Carolina	S. C.	30,989	1,515,400	Charleston	58,833	Columbia
Georgia	Ga.	59,265	2,609,121	Atlanta	154,839	Atlanta
Florida	Fla.	58,666	752,619	Jacksonville	57,699	Tallahassee

The four Southern States of the Atlantic Coast have an area about three times as large as that of New England. Owing to their warm summer climate and excellent soils, they, together with the Southern States of the Mississippi Basin, form the great cotton-producing region of the country. The larger portion of the area lies in the coastal plain and the Piedmont Belt, and hence has gentle slopes. (See Fig. 191.) The region is primarily an agricultural area, though cotton manufacturing is increasing in places, owing to the excellent water power and the abundant supply of raw material. (See Fig. 210.)

FIG. 237. *Picking cotton in Georgia.*

THE ATLANTIC COASTAL PLAIN

The coastal plain area of the Southern States of the Atlantic Coast includes all of Florida, more than half of South Carolina and Georgia, and nearly half of North Carolina. (See Figs. 191 and 238.) Except the northwest corner of Georgia, which contains the southern portion of the Great Valley, the remainder of these states is in the Piedmont Belt or the Appalachian Mountains.

Surface and Climate. The coastal plain generally is flat with only a few sand hills rising above the general lowland in South Carolina and Georgia. These sand hill regions are usually covered with forests, particularly of hard pine, from which turpentine and tar are obtained in large quantities.

The success of agriculture in this region, particularly cotton raising and rice production, depends upon the climate as much as upon the character of the soil. Owing to the influence of the ocean, spring is well developed early in March, and the growing season is long. The cotton crop requires an early spring, a late fall, plenty of heat in the summer, without too much rainfall; conditions all of which are met in these states.

Owing to the warm winter climate, the coastal portions of Florida are favorite resorts for northern people at that season. This is particularly true of *Jacksonville*, *St. Augustine*, and *Tampa*.

The offshore portion of the coastal plain is a slightly submerged continental shelf, over which the warm waters of the Gulf Stream sweep. It is studded with coral islands or keys, of which the Florida Keys are the most important. On one of these is situated *Key West*, famous for its tobacco manufactures and for the exportation of sponges, which are secured from the eastern portion of the Gulf of Mexico.

Agriculture. Bordering the coast and on the offshore islands of South Carolina, Florida,

FIG. 238.

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and Georgia, are extensive areas devoted to the production of "sea-island cotton." The fiber of this cotton is long and of great strength, so that it is particularly valuable for certain kinds of spinning. (See Fig. 237.)

In the marshy lowlands of South Carolina, Georgia, Florida, and North Carolina rice is an important crop. The seed is planted in the early spring when the marshes are flooded, and the fields have to be kept covered by water during a large part of the growing season. The production of rice in these states, however, is small as compared with the enormous crops of Louisiana and Texas.

Sugar cane is grown in the coastal plain sections of Florida and Georgia, these states ranking third and fourth in production. With the exception of Florida, the remainder of the coastal plain area not devoted to rice is planted largely to upland cotton and vegetables.

In Florida the coastal plain rises in few places over a hundred feet above the level of the sea. As a result large parts of this region are not adequately drained, and extensive swamps exist, some of which have scarcely been explored.

The climate of Florida is warm and moist, and subtropical in character. Such a climate is particularly favorable for the raising of oranges, lemons, and grape fruit, yet California far outranks Florida in the production of these fruits. Florida is unique among the other states in that it produces pineapples. (See Fig. 242.) It also raises practically all the limes grown in the United States, and leads the country in the production of guavas. These crops depend largely on the climate, and if a cold wave suddenly sweeps into northern Florida great damage follows.

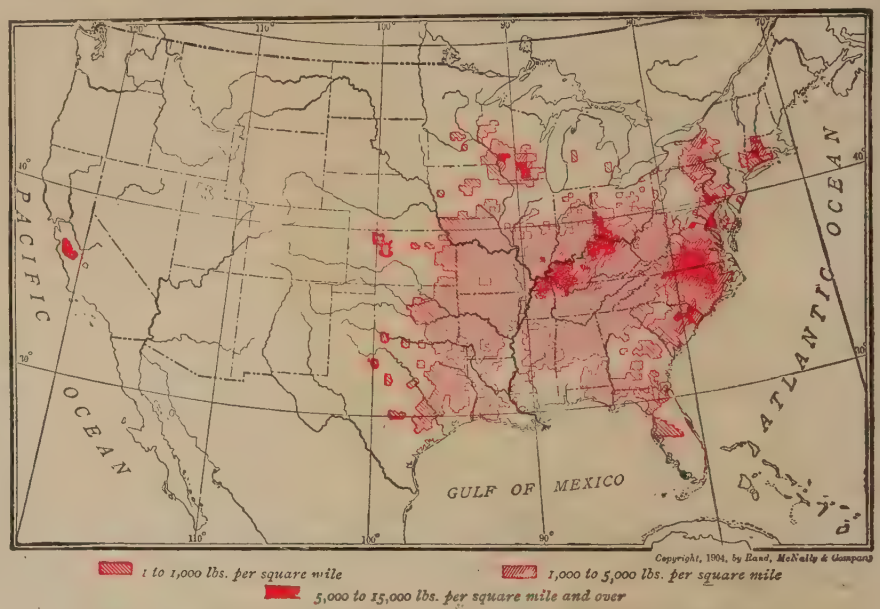

FIG. 239. *The yield of tobacco per square mile in the United States.*

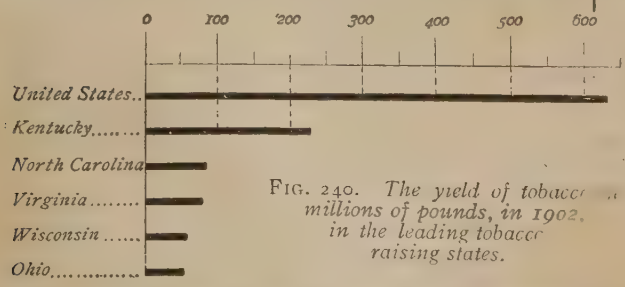

FIG. 240. *The yield of tobacco in millions of pounds, in 1902, in the leading tobacco raising states.*

Mineral Products. The rocks of the coastal plain area of Florida and South Carolina contain a great wealth of phosphate, which is valuable as a fertilizer. Florida leads the Union in the production of phosphate.

Cities. The coast of these states is generally bordered by barrier beaches, but the ... inside are too shallow to form ... s. The chief cities of the coastal ... *arleston*, S. C., and *Savannah*, G..., both of them cotton and rice ports, and *Wil...* *Jacksonville*, *Pensacola*, and *Ta...* ...ding commercial cities

of Florida. Tampa is a great tobacco manufacturing city; the tobacco used there is largely imported from Havana.

THE PIEDMONT BELT

Agriculture. The Piedmont Belt in the Southern States of the Atlantic Coast is a beautiful, rolling country in which agriculture is the principal industry. Cotton is grown in the southern portion, but in the northern tobacco is the chief crop. North Carolina is the second state in the production of tobacco, and Georgia is second in cotton. (See Fig. 249.) Corn is an important crop in this section. Southern corn requires a longer season for growth than northern, hence this variety never reaches maturity in the northern states. It is grown frequently in the North, however, for forage. No one of the southern states produces sufficient corn to be ranked among the leading corn-producing states, although this crop is grown in some abundance in all the states. Fruit growing is steadily increasing. Peaches are an important crop in Georgia.

Manufacturing. The Piedmont Belt is favored with beautiful streams which flow down from the higher Appalachian Mountains to the west, and has an abundance of water power for manufacturing. Within the last few years this water power has been more and more used, till manufacturing has become an important industry, particularly in the Piedmont area of North and South Carolina and Georgia. At the present time South Carolina is, next to Massachusetts, the largest cotton-manufacturing state in the Union. (See Fig. 211.) The chief centers for this industry in the South are *Columbia*, *Greenville*, and *Spartanburg*, S. C., *Charlotte*, N. C., and *Augusta*, *Atlanta*, and *Columbus*, Ga. (See Fig. 241.)

FIG. 241. *Cotton mills at Augusta, Georgia. This city because of the number of its mills is sometimes called the "Lowell of the South."*

FIG. 242. *A field of pineapples in Florida.*

APPALACHIAN MOUNTAINS AND GREAT VALLEY

The Appalachian Mountains reach their greatest height and beauty in North Carolina, where they are densely covered with forests. Here are a number of large private parks or forest preserves. These mountains, owing to the quality of the air, their cool summers, the magnificent water supply, and the grandeur of their scenery, are becoming more and more popular as resorts. *Asheville*, N. C., is the center of this region.

Mineral Products. The rocks of this region contain a certain amount of gold, but as yet the mineral industry of this part of the South is only slightly developed.

In the northwestern portion of Georgia the Great Valley contains immense quantities of iron, which is mined to a certain extent, and manufactured at *Rome* and *Atlanta*, Ga. The valleys, deeply set among the Appalachian Mountains, are underlaid by marble

deposits which are extensively quarried. The marble of northwestern Georgia is the whitest and purest found in this country.

Cities and Trade. The trade of the Southern States of the Atlantic Coast is largely with the North and with the Southern States of the Mississippi Basin, either by water or rail. Foreign commerce is small, due largely to poor harbors. *Savannah*, Ga., *Wilmington*, N. C., and *Pensacola*, Fla., are the chief ports in the order of their importance. Pensacola and *Tampa* trade largely with other Gulf ports and with Cuba. Savannah has a large coasting trade with New York, Philadelphia, and Boston, and is a leading cotton port. Most of the lumber from this group of states is shipped from *Jacksonville*, Fla., and the naval stores go from Savannah.

The largest inland city of this region and the leading interior wholesale market of this group of states is *Atlanta*, Ga., situated in the Piedmont Belt and having excellent railroads running in all directions. It is connected with the northern cities by two trunk lines and is so situated that it has excellent communication with Chattanooga and the Great Valley. It is the railroad center of these states, and is sometimes called the Gate City of the South.

Questions and Exercises

(1) Make a list of the states of this region in which cotton is grown. (2) Find the summer temperature and rainfall of the cotton-producing area. (3) Locate the rice-producing area. (4) In what states is rice grown? (5) Why must the United States import so much rice? (6) From what country does it come? To what ports? (7) Locate the sugar cane section. (8) Where are cotton factories located? (9) Account for their location here. (10) What effect will the growth of cotton manufacturing in the South have upon the towns in New England? (11) Locate the chief cotton and rice ports. (12) In what physical divisions is cotton grown? Tobacco? Which physical division has facilities for manufacturing? (13) Where is the densest population of this region? The least dense? (14) Give the chief advantages in the location of Atlanta. (15) Why is it called the "Gate City of the South"?

XXXII. SOUTHERN STATES OF THE MISSISSIPPI BASIN

STATE	Abbreviation	Area in sq. miles	Population 1910	Chief City	Population 1910	Capital
Tennessee	Tenn.	42,022	2,184,789	Memphis	131,105	Nashville
Alabama	Ala.	51,998	2,138,093	Birmingham	132,685	Montgomery
Mississippi	Miss.	46,865	1,797,114	Meridian	23,285	Jackson
Louisiana	La.	48,506	1,656,388	New Orleans	339,075	Baton Rouge
Texas	Tex.	265,896	3,896,542	San Antonio	96,614	Austin
Arkansas	Ark.	53,335	1,574,449	Little Rock	45,941	Little Rock
Oklahoma	Okla.	70,057	1,657,155	Oklahoma City	64,205	Oklahoma City

The several states which we may group together as the Southern States of the Mississippi Basin contain slightly more than one-fifth of the whole area of the United States. With the exception of the Cumberland Plateau, which occupies portions of Tennessee and Alabama, and the Ozark and Ouachita mountains of Arkansas and Oklahoma, this whole region is a great plain. (See Figs. 243 and 248.)

THE COASTAL PLAIN

Products of the Soil. Owing to the level surface, the unrivaled soils, and the favorable climate, all of the coastal plain east of central Texas is a magnificent farming area where great crops of cotton, sugar, and rice are produced annually. Sugar cane is raised largely in the river bottoms of the alluvial plain of the Mississippi, and in the lowlands of Texas. (See Figs. 245 and 246.) Louisiana

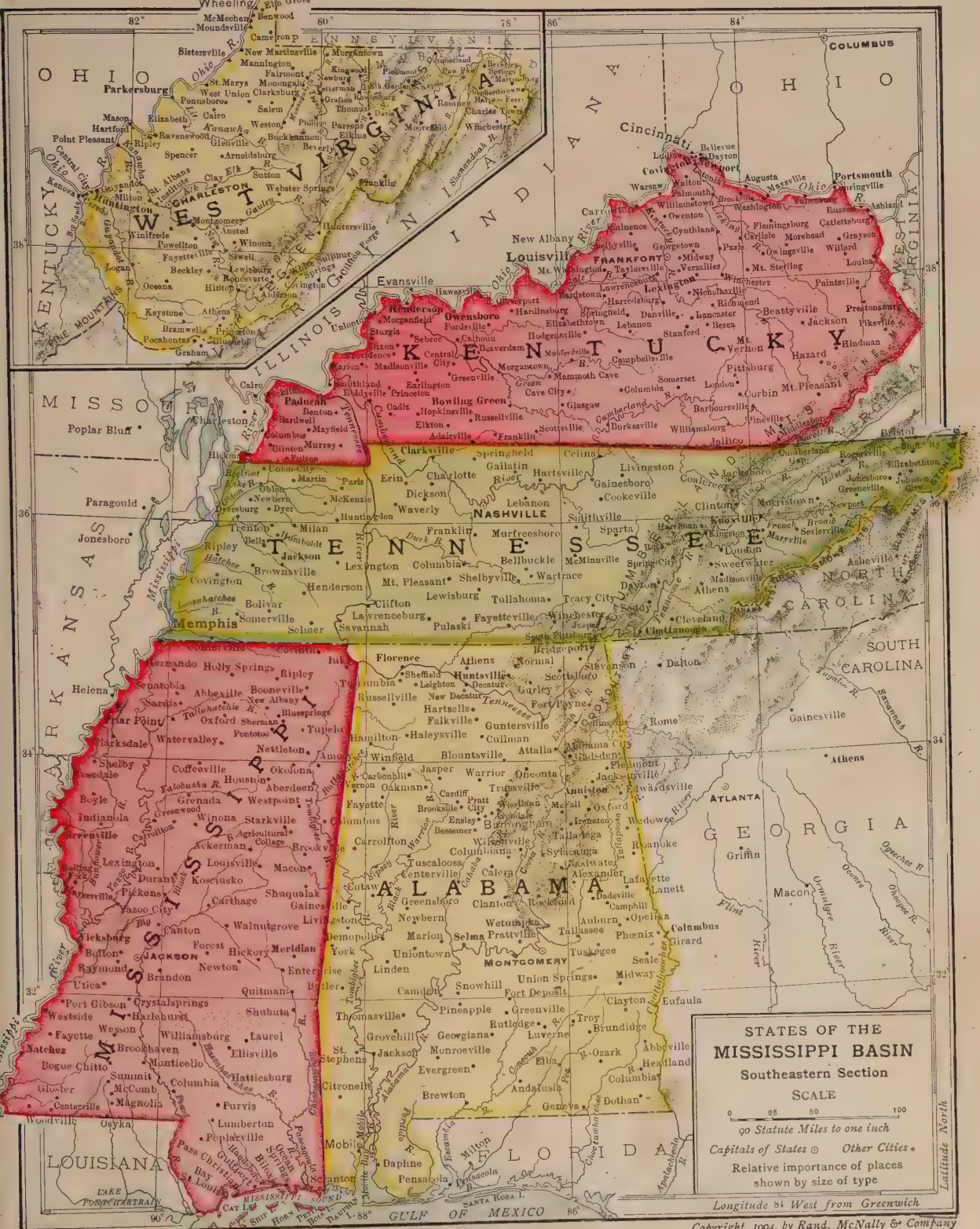

FIG. 243.

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has more than 100 times the sugar product of Texas, the next state in importance. In the production of rice, Texas leads the country; Louisiana is second in importance. Cotton is raised in all the states, but Texas produces much more than Mississippi, the third state in the Union in cotton production. (See Figs. 247 and 249.) Alabama is fourth, and the other states of the group take lesser rank in this industry. Cotton seed yields cotton-seed oil, an important product wherever cotton is raised. Berries and early vegetables for the northern markets are grown throughout these states.

FIG. 244. *Along the water front at New Orleans.*

Mineral Products. The only important mineral products in the coastal plain area are petroleum in eastern Texas and in Louisiana, and salt also in Louisiana. Texas now ranks second among petroleum-producing states.

Cities and Trade. The chief cities of the coastal plain are *New Orleans*, La., the fourth of the great ports of the country, *Galveston*, Tex.; *Mobile*, Ala.; *Houston*, Tex.; *Memphis*, Tenn.; *Meridian* and *Vicksburg*, Miss. These are all centers for the exportation of cotton.

The most important city is *New Orleans*, situated about a hundred miles up the Mississippi River, and easily reached by ocean-going vessels. (See Fig. 244.) It is a center for railroad connections with the North and with the East by lines of road passing up the Great Valley, or along the Piedmont Belt, or on the coastal plain. It is the chief cotton-exporting city in the world. Its commerce is largely with England, France, and other European countries.

Galveston, Tex., on Galveston Bay, has the best harbor in the state, and ranks next to New York in exports. Owing to its position near the great cotton fields, it is a most important cotton port, with a large foreign commerce, especially with Germany and France. *Houston*, Tex., connected by rail and by water with Galveston, is the leading cotton-packing city of Texas. *Mobile* is the principal shipping point in Alabama, not only for cotton but for other products.

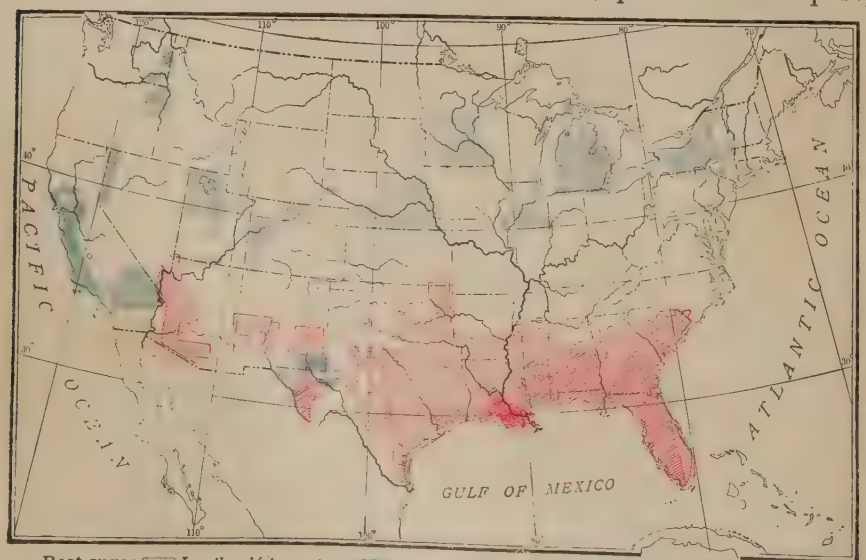

FIG. 245. *Proportion of improved land in the United States devoted to the sugar industry.*

THE GREAT VALLEY

The eastern portion of Tennessee and the northern portion of Alabama are occupied by the Great Valley and

the Cumberland Plateau. The Great Valley is a rich agricultural area and contains great quantities of limestone and iron. Marble is quarried at *Knoxville*, Tenn., while the local supplies of coal, iron, and limestone make *Birmingham*, Ala., one of the great iron-manufacturing cities of the Union. Birmingham is thus becoming the Pittsburg of the southern states. The hardwood forests found on the Cumberland Plateau and the Appalachian Mountains supply an abundance of material for the furniture factories of *Knoxville* and *Chattanooga*, Tenn., and other cities in the Great Valley. The Great Valley in eastern Tennessee is important as a highway of travel and transportation. Hence it contains all the large cities to be found in this section of the state.

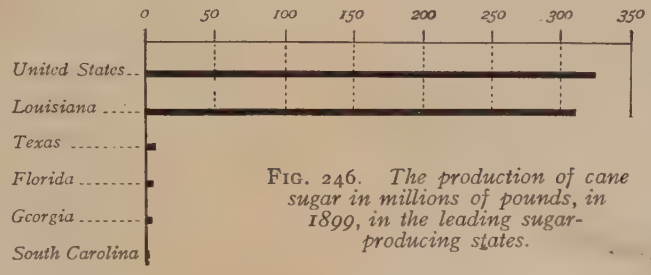

FIG. 246. *The production of cane sugar in millions of pounds, in 1899, in the leading sugar-producing states.*

THE CUMBERLAND PLATEAU

The Cumberland Plateau is a broad highland facing the Great Valley in a continuous cliff, uncut by any river except the narrow Tennessee, which is navigable to Knoxville at certain seasons.

Industries. The Cumberland Plateau has few railroads, owing to the difficulty of reaching its top. The surface is a succession of hills and valleys and is covered by dense forests of hardwoods. These forests contain some of the finest timber in the state and also afford excellent grazing. The plateau is occupied by an extremely scattered population, who get their living mainly by cultivating the crops necessary for their own consumption, or by raising cattle and hogs. There are no large cities, and good-sized towns exist only where coal mines have been opened. A vast wealth of coal underlies this region, and mining has been successfully developed at a number of places.

The Cumberland Plateau merges on the west into a series of rich limestone lowlands. *Nashville*, the capital of Tennessee, in a fine agricultural area in a rolling section of these lowlands, has important manufactures of flour and furniture. This region also produces phosphate.

Kentucky far outranks any other state in the production of hemp and tobacco (see Fig. 240), and Louisville is the chief leaf tobacco market of the world.

THE PLAINS AND THE OZARKS

In the low-lying portions of Arkansas agriculture with horticulture is the principal

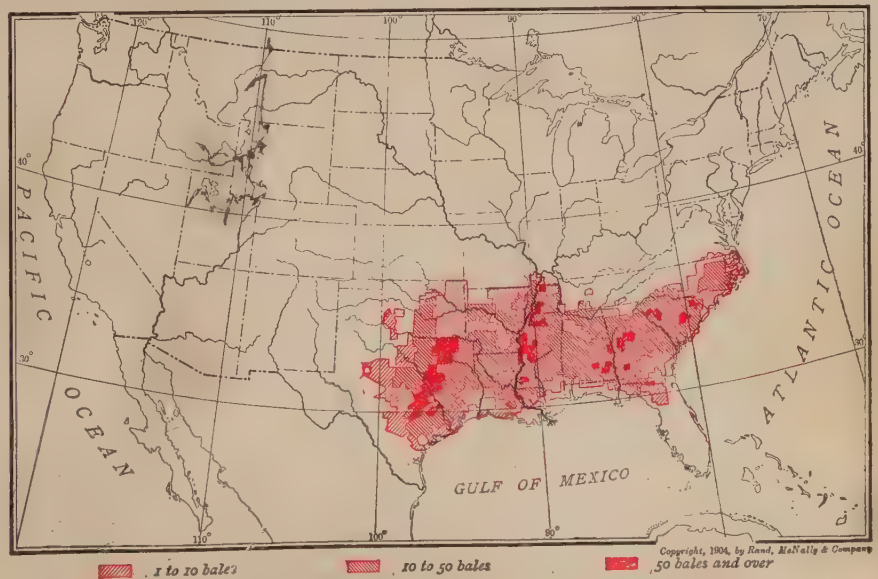

FIG. 247. *The yield of cotton per square mile in the United States.*

STATES OF THE
MISSISSIPPI BASIN
Southwestern Section
SCALE
0 25 50 100 150
125 Statute Miles to one inch
Capitals of States and Territories ◎
Other Cities •
Relative importance of places shown by size of type
Latitude North
Longitude West from Greenwich
OKLAHOMA
ARKANSAS
LOUISIANA
TEXAS
NEW MEXICO
MEXICO
GULF OF MEXICO
SANTA FÉ
ESTACADO
LLANO
AUSTIN
OKLAHOMA CITY
LITTLE ROCK
Fort Smith
Memphis
New Orleans
Galveston
Houston
Dallas
Fort Worth
San Antonio
El Paso
Laredo
Brownsville
Corpus Christi
Sabine Pass
Port Arthur
Beaumont
Shreveport
Vicksburg
Natchez
Jackson
Monroe
Texarkana
Hot Springs
Pine Bluff
Fayetteville
Springfield
Jonesboro
Batesville
Helena
Clarksville
Russellville
Morrilton
Hope
Camden
Magnolia
Eldorado
Junction City
Arkadelphia
De Queen
Prescott
Gurdon
Fordyce
Arkansas City
Monticello
Hamburg
Stamps
Homer
Farmerville
Arcadia
Minden
Ruston
Bastrop
Providence
Delta
Tallulah
Greenville
Leland
Yazoo City
Columbia
Winnsboro
Harrisburg
Natchitoches
Many
Alexandria
Pineville
Marksville
Leesville
Jackson
Kentwood
Amite
Washington
Franklinton
Covington
Mandeville
Slidell
Hammond
Ponchatoula
Lake Pontchartrain
Lake Maurepas
Lake Borgne
Lake Charles
Jennings
Opelousas
Baton Rouge
Plaquemine
Donaldsonville
Crowley
Lafayette
Abbeville
New Iberia
Jeanerette
Morgan City
Franklin
Thibodaux
Houma
Lockport
Raceland
Grand L.
Calcasieu L.
Sabine L.
Galveston I.
Matagorda I.
St. Joseph I
Mustang I.
Padre Island
Laguna Madre
Aransas Pass
Corpus Christi Bay
Matagorda Bay
Pass Cavallo
Galveston Bay
Trinity Bay
Sabine Pass
Atchafalaya Bay
Terrebone Bay
Timbalier Bay
Barataria Bay
Vermilion Bay
650 ft.
6500 ft.
Revised, 1911
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FIG. 348

occupation though coal is an important product in Oklahoma as well as in Arkansas.

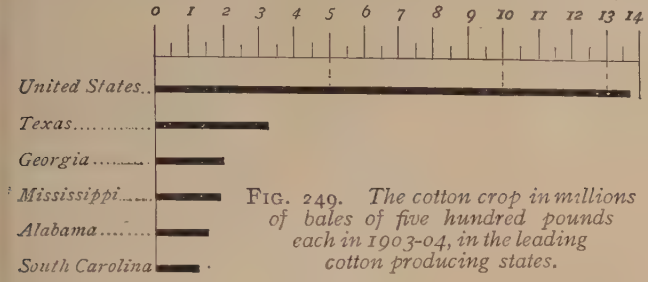

FIG. 249. *The cotton crop in millions of bales of five hundred pounds each in 1903-04, in the leading cotton producing states.*

In the forested region lumbering is an important industry. *Little Rock* is the capital and chief town in Arkansas. *Hot Springs* is famous as a health resort.

Grazing. Western Texas and Oklahoma are primarily grazing regions, owing to the dry climate. As one passes through Texas he finds himself at Houston in the center of a great cotton-producing region, with luxuriant vegetation everywhere. Between Houston and San Antonio the cotton becomes less conspicuous and a little west of San Antonio the arid country begins. Here only those plants are seen which will grow with a scanty supply of moisture, while in western Texas the vegetation is almost that of the desert. In northwestern Texas, in the valley of the Canadian River, there has been a rapid development of agriculture and manufactures in the last few years. This great western region is so dry that grazing is by far the most important occupation, and cattle, horses, and mules are raised in larger numbers in Texas than in any other state. (See Figs. 250 and 251.)

Texas is one of the principal food producing regions of the Union because of its development of the cattle industry, although throughout a large part of its area agriculture is impossible except by irrigation. In early years the cattle were allowed to wander at will over the great plains, feeding on the excellent grasses abounding there, being tended by herdsmen or cowboys. Later large parts of the area were surrounded by fences, some of the great ranches containing many square miles, so that caring for the cattle is much easier. The cattle throughout this region are largely

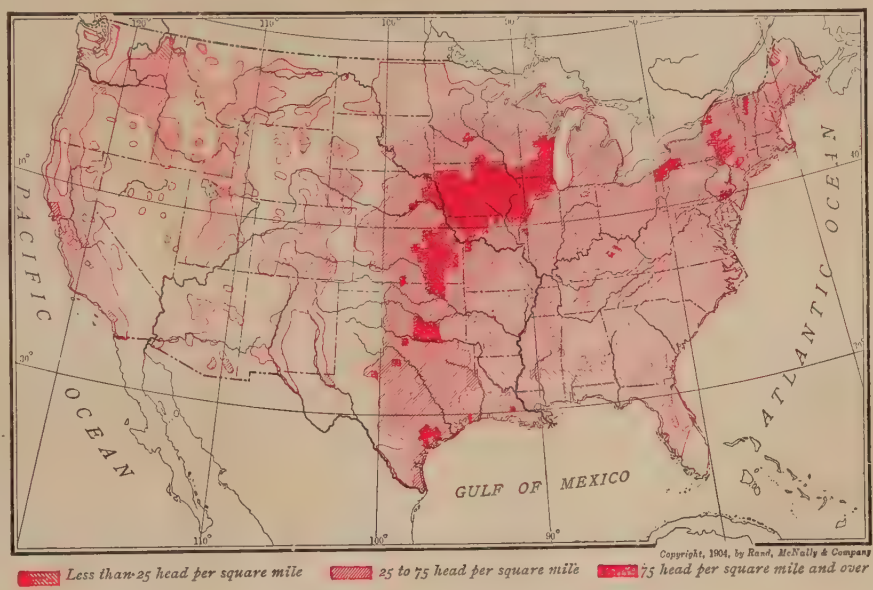

FIG. 250. *The number of cattle per square mile in the United States.*

shipped alive to the great slaughtering cities of the northern Mississippi Basin, although some are sent directly to the seaports and shipped alive to foreign countries. Throughout this vast grazing area, large enough to hold many of the states, there are naturally but few cities. The only important one in this area in Texas is *El Paso*, a railroad center on the Mexican boundary line.

The Forty-sixth State. Oklahoma is larger than Missouri, and like that state has vast agricultural and mineral resources. In recent years it has made great strides in agriculture.

Corn is the leading crop, and of this group of states only Texas exceeds it in production. Coal, petroleum, and natural gas abound. Among gas-producing states Oklahoma ranks seventh, and as a producer of petroleum is ninth. *Oklahoma City*, the capital, and *Guthrie*, are towns of phenomenal growth in a region of great fertility.

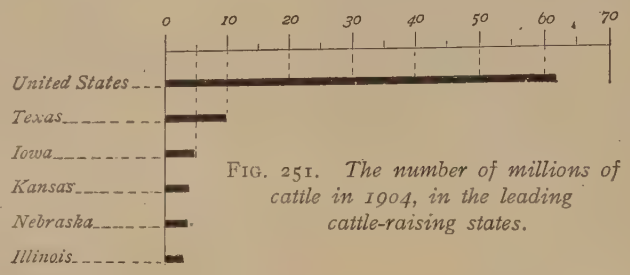

FIG. 251. *The number of millions of cattle in 1904, in the leading cattle-raising states.*

Questions and Exercises

(1) Name the advantages in the location of New Orleans. (2) Trace its railroad connections with the North, the East, and the West. (3) What does it export to European countries? (4) Find out, if you can, how the Mississippi River has been made accessible to ocean steamers. (5) What were the drawbacks to the harbor of Galveston? (6) Why is it an important port? (7) What effect will the opening of the Panama Canal have upon New Orleans? (8) What effect upon Galveston? (9) Why is Birmingham called the "Pittsburg of the South"? (10) Why should a city have grown up at Chattanooga? (11) State the importance of the Great Valley as a highway of travel. (12) Make a list of the cotton ports of the United States. (13) Make a list of all the cotton manufacturing towns of the country. (14) Why is Texas a great stock-raising state? (15) Where are the cattle shipped to be slaughtered?

XXXIII. NORTHERN STATES OF THE MISSISSIPPI BASIN

STATE	Abbreviation	Area in sq. miles	Population 1910	Chief City	Population 1910	Capital
West Virginia	W. Va.	24,170	1,221,119	Wheeling	41,641	Charleston
Ohio	Ohio	41,040	4,767,121	Cleveland	560,663	Columbus
Kentucky	Ky.	40,598	2,289,905	Louisville	223,928	Frankfort
Indiana	Ind.	36,354	2,700,876	Indianapolis	233,650	Indianapolis
Illinois	Ill.	56,665	5,638,591	Chicago	2,185,283	Springfield
Michigan	Mich.	57,980	2,810,173	Detroit	465,766	Lansing
Wisconsin	Wis.	56,066	2,333,860	Milwaukee	373,857	Madison
Minnesota	Minn.	84,682	2,075,708	Minneapolis	301,408	St. Paul
Iowa	Iowa	56,147	2,224,771	Des Moines	86,368	Des Moines
Missouri	Mo.	69,420	3,293,335	St. Louis	687,029	Jefferson City
Kansas	Kans.	82,158	1,690,949	Kansas City	82,331	Topeka
Nebraska	Nebr.	77,520	1,192,214	Omaha	124,096	Lincoln
South Dakota	S. Dak.	77,615	583,888	Sioux Falls	14,094	Pierre
North Dakota	N. Dak.	70,837	577,056	Fargo	14,331	Bismarck

The group of states in the Northern Mississippi Basin includes five out of the first ten states in population, six of the first ten in manufacturing, and seven of the first ten in agriculture. It forms one of the most important groups of states in the Union. Although they were hardly settled three-quarters of a century ago, they now contain about one-third of the entire population of the United States. (See Figs. 252 and 264.)

Surface and Soils. As we have already seen, the surface and climate of the Northern States of the Mississippi Basin are generally favorable for agriculture, except in the few highlands and in the western section where the climate is too dry. The fine glacial soils of the eastern and northern portions are exceptionally fertile and will grow excellent crops for many years in succession without being as easily worn out as are the

STATES OF THE
MISSISSIPPI BASIN
Northeastern Section
SCALE
0 25 50 100 150
98 Statute Miles to one inch
Capitals of States ⊙ Other Cities •
Relative importance of places
shown by size of type
LAKE SUPERIOR
602 ft. above Sea Level
MICHIGAN
LAKE MICHIGAN
LAKE HURON
582 ft. above Sea Level
LAKE ERIE
WISCONSIN
ILLINOIS
INDIANA
OHIO
KENTUCKY
MISSOURI
Chicago
Milwaukee
Detroit
Cleveland
Toledo
Cincinnati
Louisville
St. Louis
Indianapolis
Columbus
Springfield
Lafayette
Terre Haute
New Albany
Portsmouth
Longitude West from Greenwich
Latitude North
Revised, 1910
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FIG. 252.

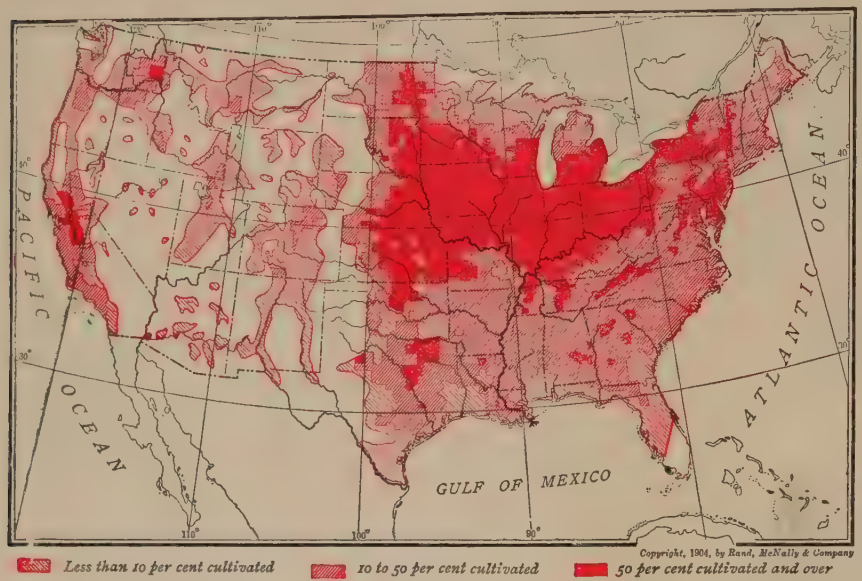


FIG. 253. *Proportion of agricultural lands to the total area in the United States.*

soils of the southern states. The highland areas are covered with forests and some of them contain mineral wealth of great value.

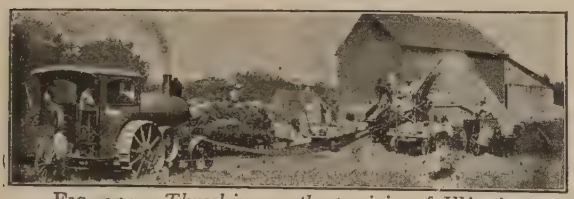


FIG. 254. *Threshing on the prairies of Illinois.*

Therefore mining and lumbering are occupations of importance in certain states. Owing to the favorable soil and climate, this region is the chief area for the growing of wheat, corn, oats, and barley, and is very important for the raising of horses, cattle, and hogs.

Climate and Vegetation. Throughout the Northern States of the Mississippi Basin the climate is warm in summer, and the rainfall is abundant except in the extreme western portion. Through the central portion of North and South Dakota, Nebraska, and Kansas the rainfall is usually sufficient for agriculture. Here, as in the eastern section, where rainfall is abundant and well distributed, vegetation flourishes and large crops are raised annually. Throughout these areas natural conditions also encourage dairying and this industry is steadily growing in importance.

In the western portion, where the rainfall is scanty, grazing is the usual occupation and agriculture is carried on by means of irrigation. The water for irrigation and for the cattle is secured largely from artesian wells. Artesian wells are sunk to the underlying layers of rock which contain water, and the water either flows of its own pressure or is pumped to the surface. The wind is so strong and so constant in this area, where the moving air is not impeded by any highlands, that windmills are commonly used for pumping water.

Forests are found in the highlands where the moisture is sufficiently great to furnish

FIG. 255. *A typical farm scene in Indiana.*

them the means of growth. In the northeast the principal trees are maples, birches, pine, spruce, hemlock, and beech, all of which furnish timber of value in building. The characteristic trees of the southern highlands are chestnut, ash, and hickory. The Indians of the plains formerly made annual trips to the great forests of the Black Hills to secure poles for their lodges, oftentimes traveling great distances in order to obtain them.

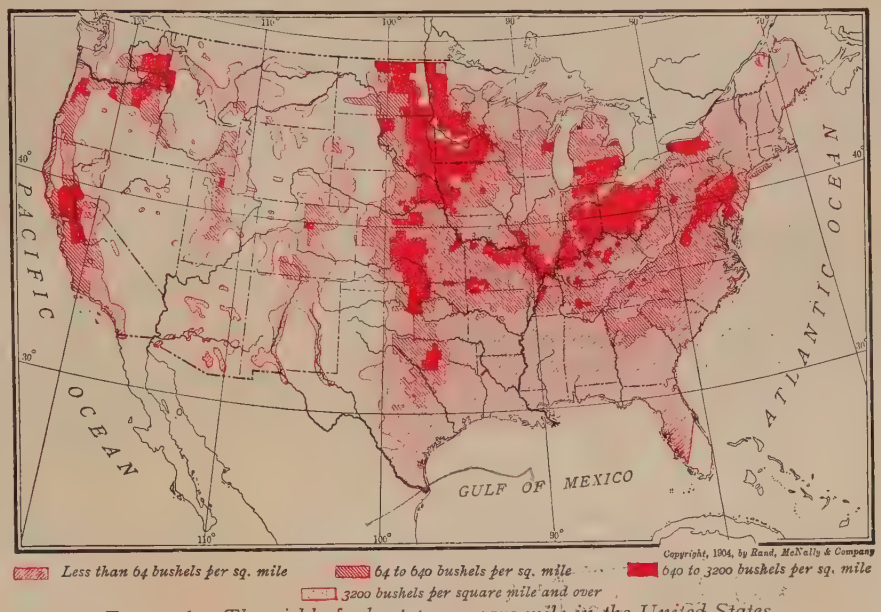


FIG. 256. *The yield of wheat per square mile in the United States.*

Outside of these regions few trees are found except along the water courses where the underground water is sufficient for their needs. Oftentimes in the western portion of the states a line of trees may be seen defining the course of a stream. Such a line is a sure sign of water at no great depth, even when none appears on the surface. During the early exploration of the plains many people suffered severely from the lack of water when a few moments of digging in the sand would have furnished a supply.

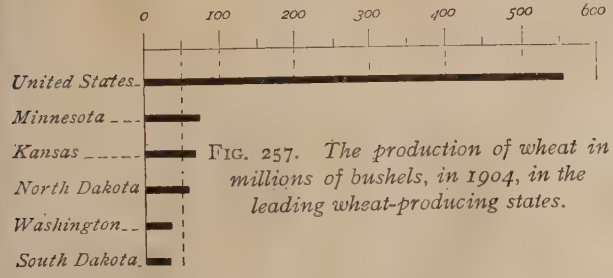


FIG. 257. *The production of wheat in millions of bushels, in 1904, in the leading wheat-producing states.*

Agriculture. Agriculture, and especially the raising of cereals, is the chief industry in this section and fine farms abound. (See Figs. 255 and 261.) Wheat is the most valuable cereal, and in its production Minnesota, Kansas, and North Dakota lead the Union. South Dakota and Nebraska rank fifth and sixth. Here natural conditions favor the raising of cereals. The spring comes early and the growing season is long. The summers are warm, sunshine abounds, and the soil is firm, so that it holds the roots of the stalks and permits them to be swayed by the wind without being blown over. In the wheat-growing states the whole area for miles in every direction seems like one great wheat field, broken occasionally by the farmhouses and farm buildings. (See Figs. 256 and 257.)

The slopes in the wheat area are so gentle that the crop may be planted and reaped by machinery. Hence the cost of production is not so great as in the eastern states, where reaping has to be done largely by hand. The wheat is threshed by machinery (see Fig. 254) and sent to the markets by rail.

At the larger cities the wheat is made into flour or is transshipped to the East for local use or for shipment abroad. The principal ports for wheat are *Superior*, Wis., *Duluth*, Minn. (see Fig. 258), and *Chicago*, Ill., because of their excellent water connection through the Great Lakes to the East. *Minneapolis*, Minn., at the Falls of St. Anthony on the

FIG. 258. *Duluth, the city at the head of the Great Lakes.*

Mississippi, is the greatest wheat-milling city in the world. Owing to its position near the wheat fields, and to its excellent railway connection with the region of production, and also to its natural water power, it early took front rank as a milling center. That position it has maintained, though a large part of the milling is now done by steam power. *Milwaukee*, Wis., which is also near the wheat fields and has a more favorable position for shipping, is the third city in the country for wheat milling, while *Chicago*, Ill., *Toledo*, Ohio, and *St. Louis*, Mo., follow it closely.

Corn, which is used mostly as a feed for cattle in other countries, is used also as food in this country and Mexico. It is produced in greater quantities than any other cereal in the Northern States of the Mississippi Basin. It requires more warmth than wheat, and is therefore grown more extensively in the southern portion of this region than in the northern. It also requires warm nights as well as days, and plenty of sunshine during the growing season. These conditions are found in this group of states. The chief corn-producing states of the Union in the order of their importance are Illinois, Iowa, Nebraska, and Missouri, which, with Indiana, Kansas, and Ohio, are often grouped together and called the corn belt. Much of the corn is used in the region as feed for hogs and cattle; some of it is made into hominy and breakfast foods, but nearly a quarter of the crop is shipped to the East for local use or for export. The larger portion of the corn bought in the feed stores in the East comes from this area, though much comes from the southern states. (See Figs. 259, 260, and 272.)

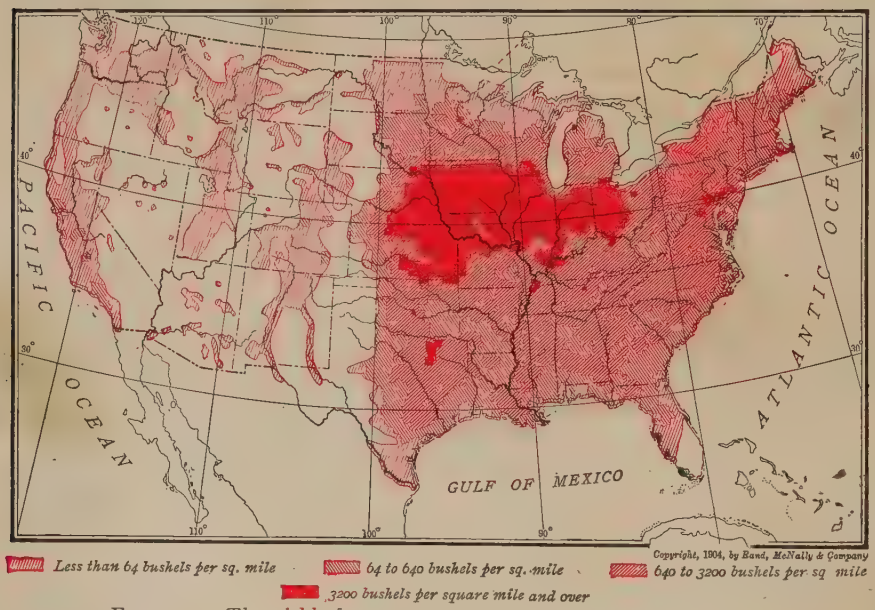


FIG. 259. *The yield of corn per square mile in the United States.*

Oats, barley, and rye are also important cereals in some of the states. Iowa and Illinois lead in the production of oats. (See Figs. 262 and 263.) Minnesota leads the

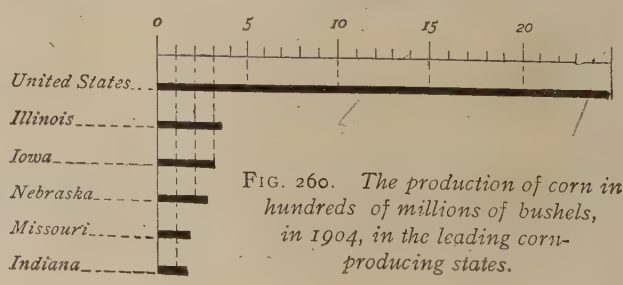


FIG. 260. *The production of corn in hundreds of millions of bushels, in 1904, in the leading corn-producing states.*

Union in the production of barley, and North Dakota, Wisconsin, and Iowa hold third, fourth, and fifth places. Wisconsin is the second and Nebraska the fourth state in the raising of rye.

FIG. 261. *A typical farm scene in Iowa.*

Another crop of great commercial importance in these states is flax. Flax, which is raised in this country for the oil contained in its seeds, is grown extensively in North Dakota, Minnesota, and South Dakota. North Dakota, in 1889 seventh among flax-producing states, to-day leads with a crop that exceeds one-half of the total product of the country. In many parts of the world flax is also grown for the fiber it furnishes, but in our country very little is raised for this purpose.

Not all the agricultural land of the northern Mississippi Basin is devoted to the crops we have mentioned, however, for many other crops are of importance. Michigan is the third state in the Union in the production of beets for sugar, the first in the raising of peas and of beans. It also furnishes more than sixty per cent of the oil of peppermint produced in the world. Iowa holds second place as a producer of hay. (See Figs. 270 and 271.)

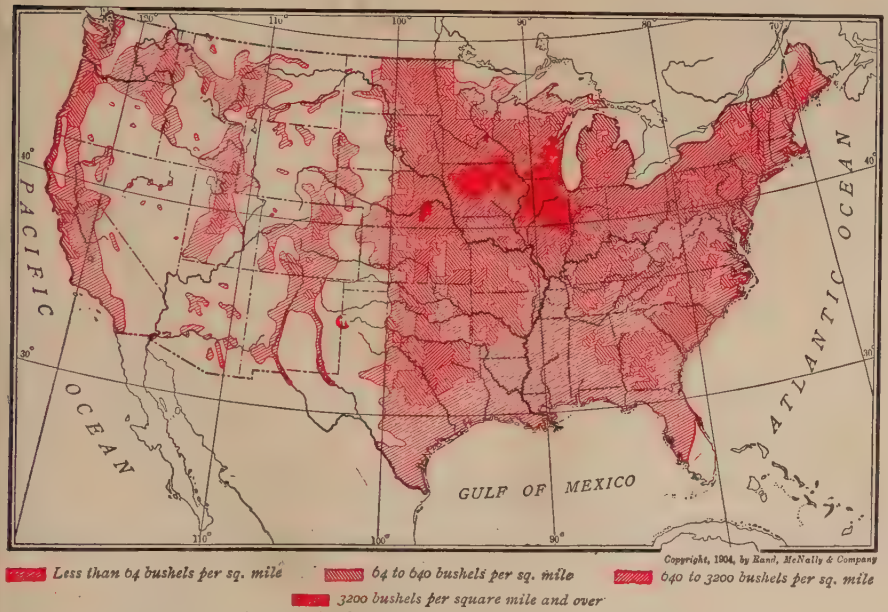


FIG. 262. *The yield of oats per square mile in the United States.*

In northern Ohio along Lake Erie, as in New York along Lake Ontario, the climatic conditions favor the growing of grapes and small fruits. As a result, the state of Ohio is third in the Union in the production of grapes and apples,

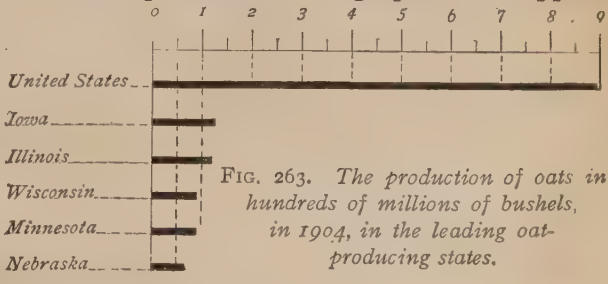
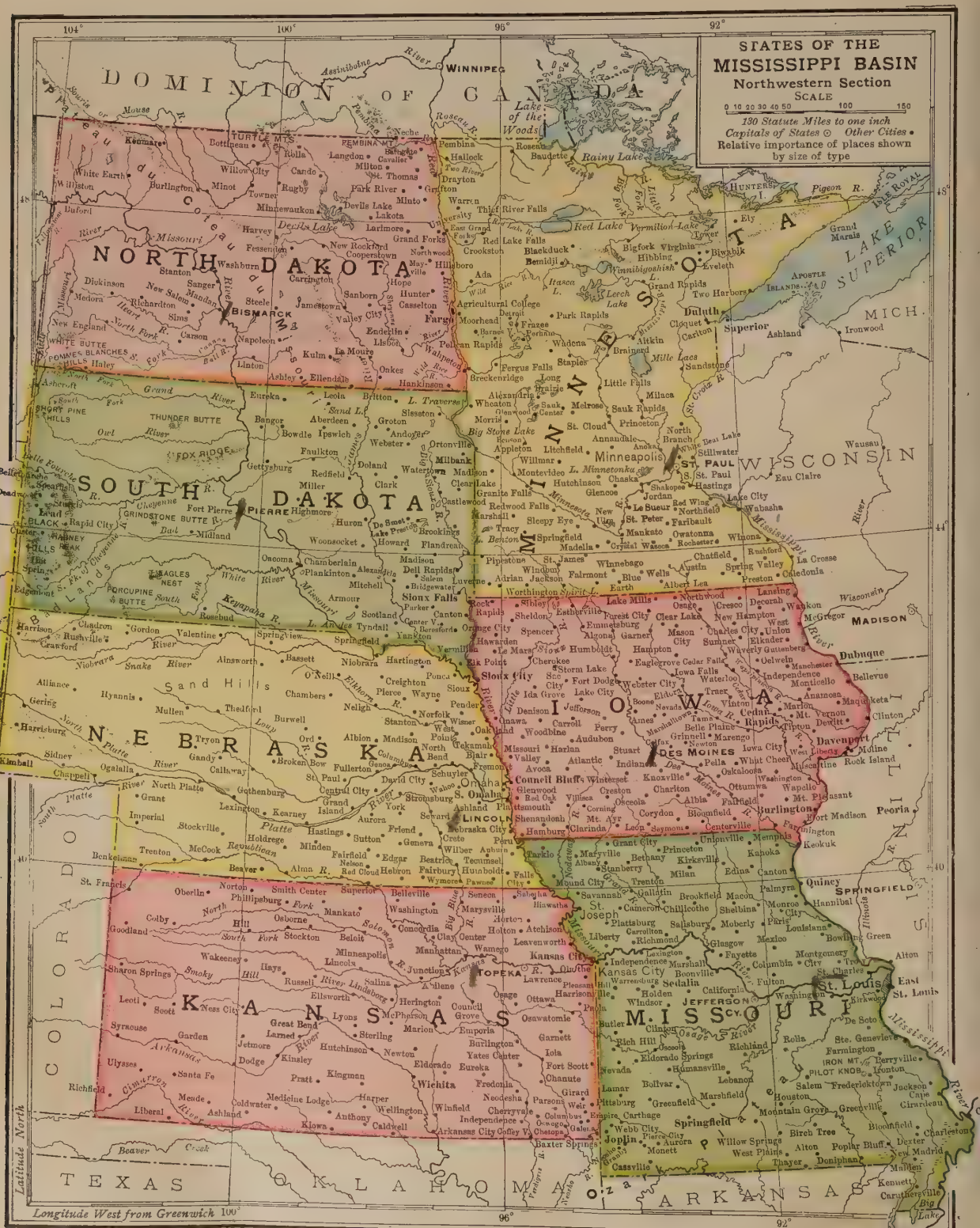


FIG. 263. *The production of oats in hundreds of millions of bushels, in 1904, in the leading oat-producing states.*



Revised, 1910

FIG. 264.

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and second in small fruits. Michigan, Illinois, and Indiana also have large apple crops, and likewise rank high among the leading states of the country in the production of grapes and small fruits.

Wisconsin and Ohio raise large amounts of tobacco, but are outranked by Kentucky, North Carolina, and Virginia.

Animals and Animal Products. Owing to the abundance of cereals raised, these states are of great importance for their cattle, horses, hogs, and sheep. In the western section the cattle are raised very largely on ranches, as they are to the south in Texas and Oklahoma. In the east they are usually raised on fenced farms. Next to Texas, the four states of Iowa, Kansas, Nebraska, and Illinois lead in cattle raising. Iowa ranks first in the Union in the production of butter, and Wisconsin is second in the production of cheese. These products are sent in great abundance to the eastern states for consumption there. Ohio and Michigan raise large numbers of sheep, and the wool produced in these states is of great importance in the woolen mills of the East.

FIG. 266. *The stock yards at Chicago.*

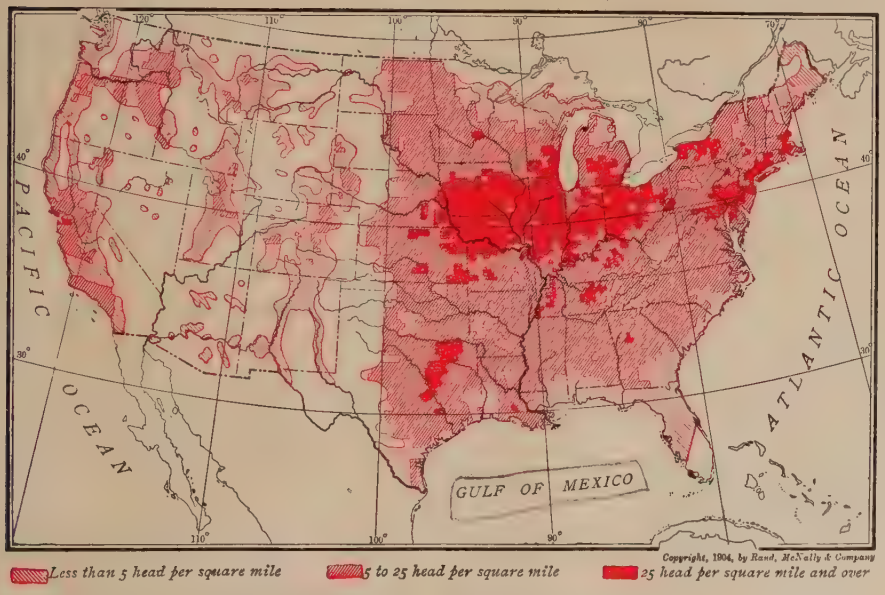

FIG. 265. *The number of horses and mules per square mile in the United States.*

Illinois and Iowa are the second and third states in the raising of horses, and Missouri raises more mules than any other state except Texas. Iowa, Illinois, Missouri, and Nebraska, owing to the great corn crop, raise more hogs. (See Figs. 268 and 269.)

Although great numbers of hogs, sheep, and cattle are sent to the eastern cities alive, and some are exported alive, by far the larger number are slaughtered in the meat-packing cities of *Chicago*, Ill., *Kansas City*, Kans., *South Omaha*, Nebr., *St. Joseph*, Mo., and *Indianapolis*, Ind. The meat products can be readily shipped east for consumption or export since

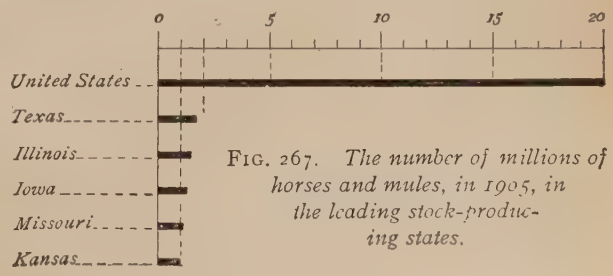

FIG. 267. *The number of millions of horses and mules, in 1905, in the leading stock-producing states.*

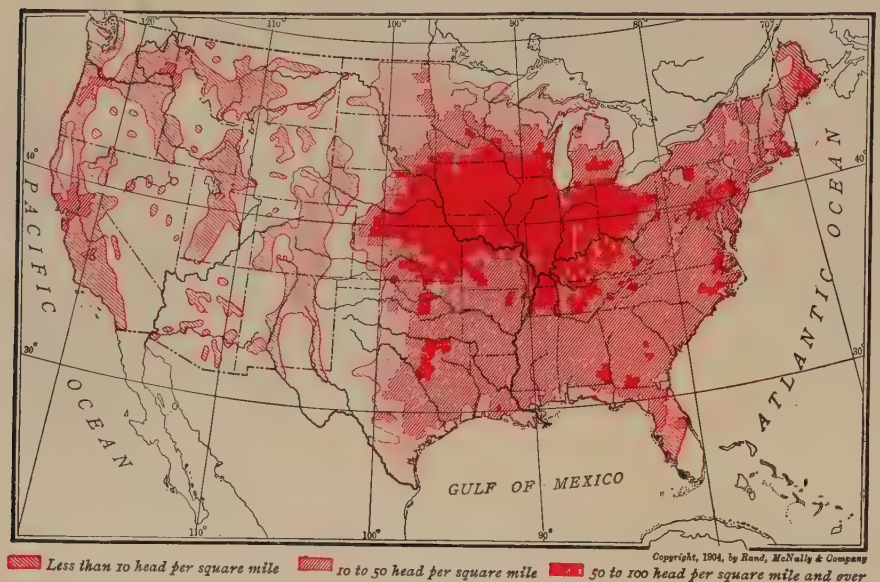

FIG. 268. *The number of hogs per square mile in the United States.*

the invention of the refrigerator car, which makes it possible to transport meat long distances without spoiling.

Forest Products. The United States furnishes more timber and lumber products than any other country. The most important states in the lumbering industry are Wisconsin, Michigan, and Minnesota. (See Figs. 273, 274, and 275.) A large portion of the lumber is shipped to planing mills. Much of it is made into sashes, doors, blinds, and boards, in the making of which *Chicago* is the second city in the Union. The hardwood is largely made into furniture at *Chicago* and at *Grand Rapids*, Mich., the second and third furniture-making cities of the country. In Wisconsin and Ohio the making of paper from wood pulp is also an important industry. The making of maple syrup is an important occupation in Ohio, this state producing more than any other.

Questions and Exercises

(1) Name the states of this region. (2) What advantages do they possess in surface, soil, and position? (3) How do the states east of the Mississippi compare with those west in these advantages? (4) What difference in industries is found between the eastern part of this region and the western? (5) In which section are artesian wells numerous? Why? (6) What is an artesian well? (7) Which part of this area is practically treeless? (8) Compare methods of farming in this region with those in New England. (9) Why should Minneapolis be a big milling city and Duluth and Chicago wheat-exporting cities? (10) Describe how the lake steamers at Duluth and Chicago are loaded with wheat. (11) Where must the wheat destined for Europe be reshipped? (12) What influence has this had upon the growth of towns? (13) Make a list of the chief uses of corn. (14) What states of this region are in the corn belt? (15) What makes the climate of Ohio and New York mild enough to ripen grapes? (16) What states of this region are in the wheat belt? (17) What states of this region produce iron?

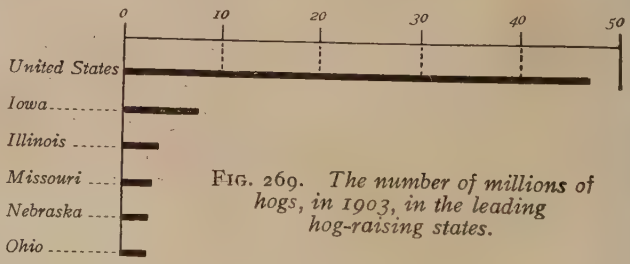

FIG. 269. *The number of millions of hogs, in 1903, in the leading hog-raising states.*

XXXIV. NORTHERN STATES OF THE MISSISSIPPI BASIN (Continued)

Mineral Products. The Northern States of the Mississippi Basin are extremely rich in mineral products, especially in coal, natural gas, petroleum, iron, copper, lead, zinc, gold, salt, and building stones. (See Figs. 221 and 227.) Nearly three-fourths of the iron ore produced in the country comes from the Lake Superior region. Minnesota and Michigan are the two leading iron-producing

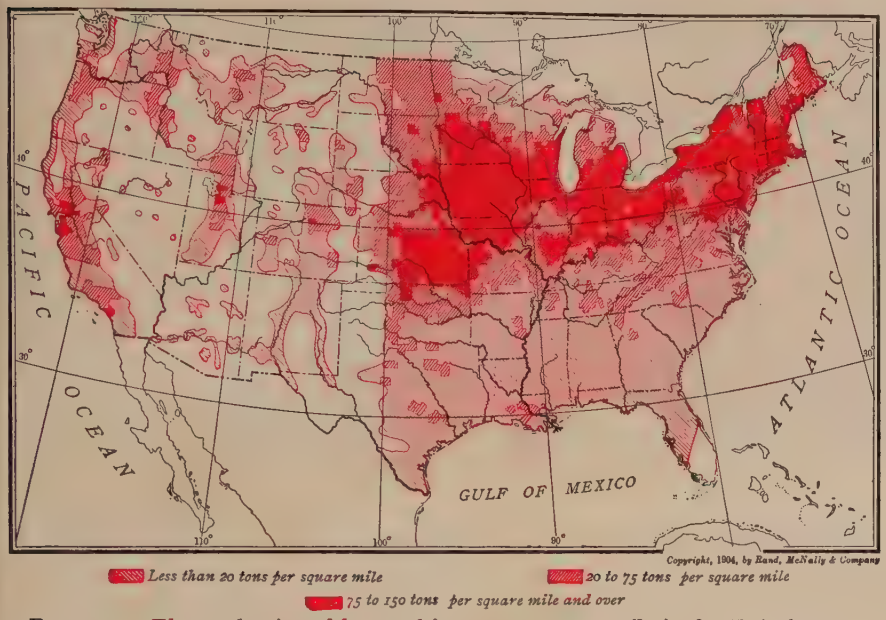

FIG. 270. *The production of hay and forage per square mile in the United States.*

states. In some cases the ore lies deep underground and has to be mined like any other mineral. In other cases, as in certain parts of Minnesota and Michigan, it lies on the surface and can be loaded directly into cars by means of steam shovels. This makes the mining cheap and easy. (See Fig. 287.)

Coal of the kind to make coke, which is used in the smelting of iron, is not abundant near these iron fields. Hence the ore is sent to the large iron-making cities of the East for manufacture. *Duluth* (see Fig. 278) and *Two Harbors*, Minn., *Ashland* and *Superior*, Wis., *Escanaba* and *Marquette*, Mich., because of their position on the lakes and nearness to the ore fields, are the chief ore-shipping cities. Most of the product is sent east to other lake ports near the steel-making cities of *Ashtabula*, *Cleveland*, and *Conneaut*, Ohio, *Erie*, Pa., and *Buffalo*, N. Y. Here it is either manufactured or shipped overland to the large iron and steel making cities of Pennsylvania.

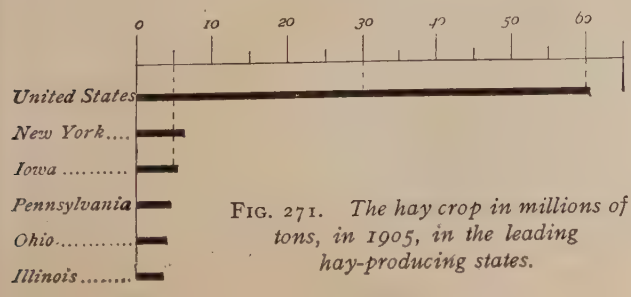

FIG. 271. *The hay crop in millions of tons, in 1905, in the leading hay-producing states.*

In the production of copper the Lake Superior district of Michigan ranks next to Montana. The copper is found largely at a great depth, some of the mines being a mile deep. The copper from these mines is very pure, however, and it therefore pays to mine it, even though the expense is great. In late years the use of copper has greatly increased, owing to the development of electricity. The best telephone and telegraph wires are made of copper, and copper is used in the arts in many ways.

FIG. 272. *A farm scene in the corn area of Missouri.*

Coal is generally distributed throughout this group of states. The coal is all bituminous, however, and not so valuable as the hard coals of Pennsylvania. Illinois, West Virginia, and Ohio are, next to Pennsylvania, the chief coal-producing states of the Union. (See Figs. 221 and 222.) In West Virginia much of the coal is made into coke for the iron and steel mills. The eastern states of this group are important for their supplies of petroleum and

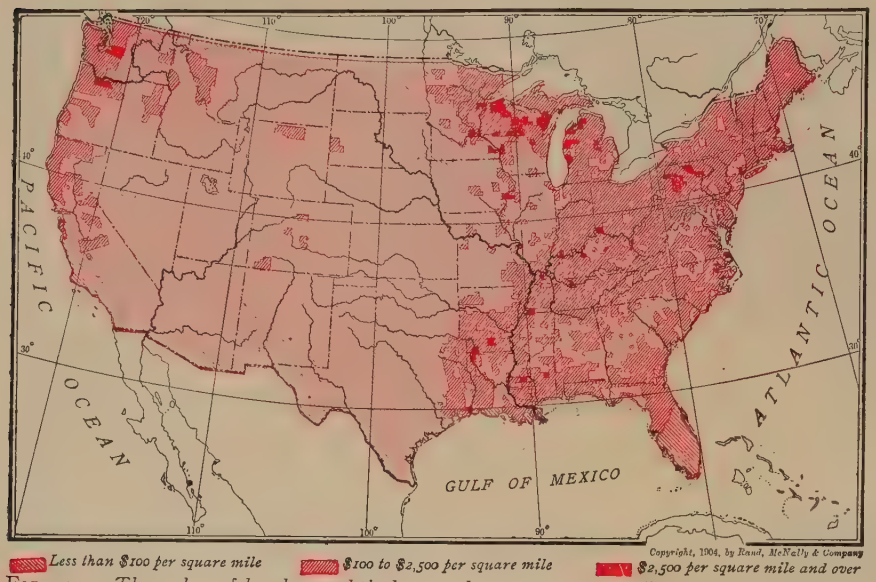

FIG. 273. *The value of lumber and timber products per square mile in the United States.*

natural gas. Ohio and West Virginia are the leading states of the group in the production of petroleum, and Indiana and West Virginia are the first in natural gas. These fields are a continuation of the fields found in Pennsylvania and New York. (See Fig. 227.) The petroleum is largely sent to eastern cities, where it is refined for the world's trade, in which the United States leads. The oil is sent across the country by means of pipes, thereby saving the cost of transportation by rail. It is distributed to the refineries in the same way that water in large cities and many towns is distributed to the houses. Natural gas, in the regions where it is found, is largely used for illuminating and for fuel, not only in the houses but also in the factories. The supply of natural gas is not so abundant as that of oil. In fact, natural gas has given out in some places, so that a few cities have been obliged to return to the use of coal as fuel.

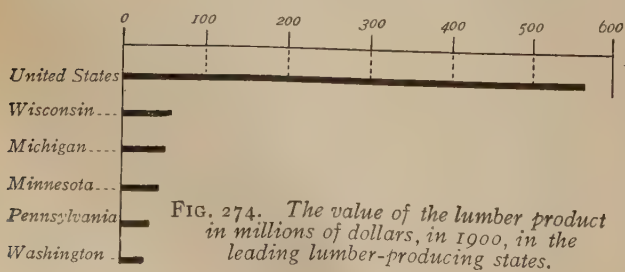

FIG. 274. *The value of the lumber product in millions of dollars, in 1900, in the leading lumber-producing states.*

Another rock product of value is clay. It is found in several states, but is of special value in Ohio, where a superior variety used in making pottery occurs. Terra cotta, fire clay, and pottery are leading products about *Zanesville* and *East Liverpool*, Ohio. Building stones exist in several of the states. Indiana produces a fine limestone. Kansas, Illinois, and Missouri yield most of the zinc used in the United States, and these states as well as Wisconsin are important for their lead ores. Michigan, Ohio, and Kansas are, next to New York, the leading salt-producing states.

FIG. 275. *A paper mill in Minnesota beside a river filled with logs.*

Manufacturing. Besides the manufactures associated with the animal products and lumber, already mentioned, this group of states has such a wealth of other finished products that Illinois is the third and Ohio the fifth manufacturing state in the Union. (See Fig. 233.) The value of the manufac-

tures of this group of states as a whole, however, is second to that of the Middle States of the Atlantic Coast. The success of manufacturing is due largely to the nearness of the raw materials, to the easily accessible fuels, and to the excellent facilities for trade which these states enjoy. Owing to the position that agriculture holds in this group of states, Illinois and Ohio lead in the production of agricultural implements. Illinois and Michigan lead in the making of railroad cars, and Ohio and Indiana in the making of carriages.

FIG. 276. *Looking toward the Illinois Steel Works, South Chicago.*

Trade and Cities. The states of this group have admirable facilities for sending their products to market. The Great Lakes furnish the finest system of interior waterways in the world, and are available for commerce from about the first of April to the first of December. Hence the cities about the lakes have increased in size and importance at a phenomenal rate. The completion of a canal about the rapids of St. Marys River has made it possible for the iron, the copper, and the wheat from the Lake Superior region to be shipped to Buffalo without transshipment of cargoes.

The Mississippi system, with its many thousands of miles of navigable streams penetrating the whole region, offers another great water route leading toward the southern ports. Practically all the large cities of the region have therefore grown up along the lakes or the rivers of the Mississippi Basin. The long stretches of nearly level land where the slopes are gentle have favored the development of railways, so that this area is covered with a network of roads, especially in the eastern part, where the products to be sent to market are most valuable. In many of the states the railroads have been paralleled in recent years by electric roads, so that the farmers have unusual facilities for shipping their products.

Chicago, Ill., is the chief city of the Northern States of the Mississippi Basin, and the second city in size in the Union. It is located at the southern end of Lake Michigan, and because of the unusually favorable opportunities presented for manufacturing and trade, its growth has been phenomenal. It is the nearest large city to the corn-growing area, and is within reach of the lumber, coal, and iron regions. All railroads from the Northwest as well as many from the East center at this point, as all goods shipped by land between these regions must go around the lake. Chicago also

FIG. 277. *Along the water front, St. Louis.*

has ready rail communication with the cities of the Southern States of the Mississippi Basin. It is the greatest railway center in the world.

When the great Chicago Drainage Canal, which connects the city with the Illinois River, is opened for navigation purposes, Chicago will have a water route available for large vessels connecting it with the Mississippi River and the Gulf of Mexico.

FIG. 278. *Docks and elevators at Duluth.*

Because of all these natural advantages dependent on its location, Chicago has developed in less than a century from a small frontier fort to its present position as the second city of the country in population and manufactures and the fifth largest city in the world. It is first in the slaughtering of cattle and hogs (see Fig. 266) and in the production of agricultural implements; second in the making of ready-made clothing; and third in the production of steel and iron goods. (See Fig. 276.) It also has many other manufacturing industries of great value, and is the financial center of this group of states, as New York is of the eastern states.

Chicago is also an interesting city because of its large educational institutions, museums, and high buildings. It is regularly laid out on the prairies, and contains many beautiful parks and avenues. (See Figs. 279 and 280.)

St. Louis, Mo., the fourth city of the Union, is important for its production of flour, meat products, iron and steel, finished tobacco, and malt liquors. Owing to its position on the Mississippi and close to the mouth of the Missouri, it has excellent facilities for water trade. It has fine railway facilities; the famous Ead's Bridge across the Mississippi is 2,225 feet long, and the Union Railway Station covers eleven acres of ground. (See Fig. 277.)

Milwaukee, Wis., from its position on Lake Michigan, is also favorably located for manufacturing and for carrying on an extensive trade. It is important for its manufactures of foundry products, leather, and malt liquors.

Minneapolis and St. Paul, Minn., called the "Twin Cities," at the head of navigation of the Mississippi, because of their position near the wheat fields and the lumber forests have grown and developed rapidly. Minneapolis (see Fig. 281) is the largest flour-milling center in the world.

Detroit, Mich., from its position on the river connecting Lake Huron and Lake Erie, is an enterprising railroad center and lake port. It is important for its manufacturing of cars and for its shipping of grain, pork, and ores.

Cleveland, Ohio, on Lake Erie, is the leading shipping point in the state. It is busily engaged in iron and steel manufacturing, oil refining, and shipbuilding. *Cincinnati*, Ohio, the largest city in the Ohio Valley, and *Wheeling* and *Huntington*, W. Va., farther up the same river, are manufacturing centers.

Indianapolis, Ind., is a thriving manufacturing place and an active railway center.

The western group of these states, owing

FIG. 279. *Along the Lake Front, Chicago.*

to the prevailing occupations, agriculture and grazing, has a scattered population and few large cities except along the Missouri River. The principal ones are those that have developed as railroad centers for the region roundabout. The larger are *Kansas City*, Mo.; *Omaha*, Nebr., and *St. Joseph*, Mo., all important markets for cattle, sheep, and horses. Many portions of these states, however, are far removed from railroads, which do not form a network over the country as they do in the eastern section. The principal roads are the great transcontinental lines running east and west between the eastern cities and the cities of the Plateau States. (See Fig. 285.)

FIG. 280. *Looking down into the midst of Chicago.*

FIG. 281. *Looking toward the flour-milling district in Minneapolis.*

Questions and Exercises

(1) Name the great cattle-raising states. (2) Trace the route by which the wool from Wisconsin gets to Massachusetts. (3) Locate the large meat-packing cities, and trace the route by which Kansas City beef gets to Philadelphia. (4) Give one reason why Grand Rapids should manufacture furniture; Wisconsin, wood pulp. (5) What are the great iron-shipping cities? (6) Trace the route by which iron from Duluth reaches Pittsburg. (7) Draw a map of the Great Lakes, and locate on it the chief commercial cities. (8) State the importance of the rapids at the "Soo." (9) Compare the importance of the "Soo" and the Suez canals. (10) Draw a diagram showing the chief advantages of the location of Chicago. (11) Draw the chief lines of railroad which center in this city. (12) Tell about its growth.

XXXV. THE PLATEAU STATES

STATE	Abbreviation	Area in sq. miles	Population 1910	Chief City	Population 1910	Capital
Montana	Mont.	146,572	376,053	Butte	39,165	Helena
Wyoming	Wyo.	97,914	145,965	Cheyenne	11,320	Cheyenne
Colorado	Colo.	103,948	799,024	Denver	213,381	Denver
New Mexico (Ter.)	N. Mex.	122,634	327,301	Albuquerque	11,020	Santa Fe
Arizona (Ter.)	Ariz.	113,956	204,354	Tucson	13,193	Phœnix
Nevada	Nev.	110,690	81,875	Reno	10,867	Carson City
Utah	Utah	84,990	373,351	Salt Lake City	92,777	Salt Lake City
Idaho	Idaho	84,313	325,594	Boise	17,358	Boise

Surface and Climate. The surface of the Plateau States is extremely rugged, except to the east of the Rocky Mountains and in parts of the Great Basin, where the slopes are, in places, gentle, though the elevation is high. The climate is dry, except in the higher

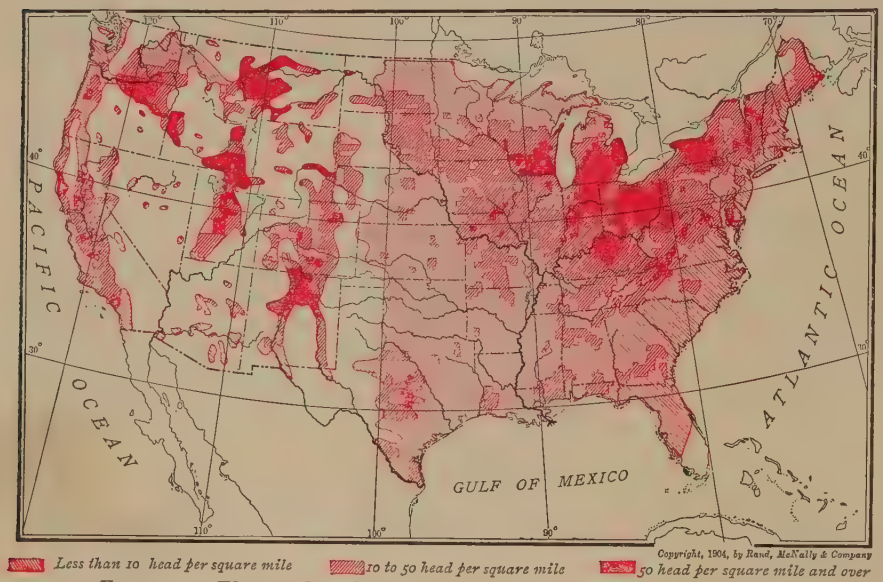

FIG. 282. *The number of sheep per square mile in the United States.*

their clear, dry air, to their beautiful scenery, or to the presence of medicinal hot springs.

Agriculture. Agriculture succeeds only where irrigation is practiced, as in the larger river valleys and parts of the Great Basin. Naturally fertile, under irrigation (see Fig. 290) the soil yields large returns, and Colorado ranks first and Utah fourth in the production of sugar beets. Yet no state compares in the value of its agricultural products with the Northern States of the Mississippi Basin.

mountains, where there is enough moisture for the growth of trees. As a result, the occupations in the Plateau States are largely grazing and mining. The population is consequently scattered, being mostly centered about the mining towns and in a few large cities in the lower regions, which have developed because they are favorably situated for trade. The population of this whole group of states is only a little more than that of the city of Chicago.

Grazing. The principal form of grazing is the raising of sheep, though cattle are raised in large numbers in certain parts of some of the states. Montana, Wyoming, New Mexico, and Idaho lead all the states in the Union in the number of sheep raised, and Montana and Wyoming are also the leading states in the production of wool. (See Figs. 282, 283, and 284.) As sheep eat clean wherever they go, they have done great damage to the young and tender trees in the forests. As a result, grazing in the forests is now being restricted.

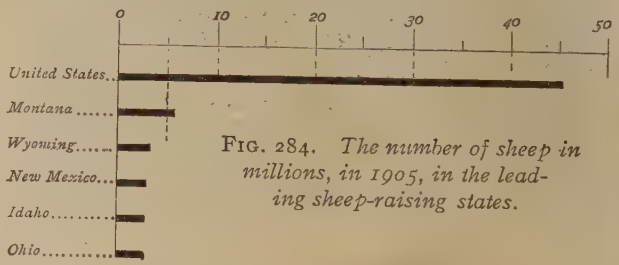

FIG. 284. *The number of sheep in millions, in 1905, in the leading sheep-raising states.*

The scenery is everywhere grand and impressive (see Fig. 175), but there are enormous areas in the highlands that are little known, and undeveloped because they contain no valuable products except lumber. Owing to the distance from the markets and the consequent cost of transportation, the forests have been of little value thus far. Many of the mountain regions and the hills at the foot of the mountains have become famous as health and pleasure resorts, owing to

FIG. 283. *A scene on a sheep ranch in the grazing region of Montana.*

Revised, 1910

FIG. 285.

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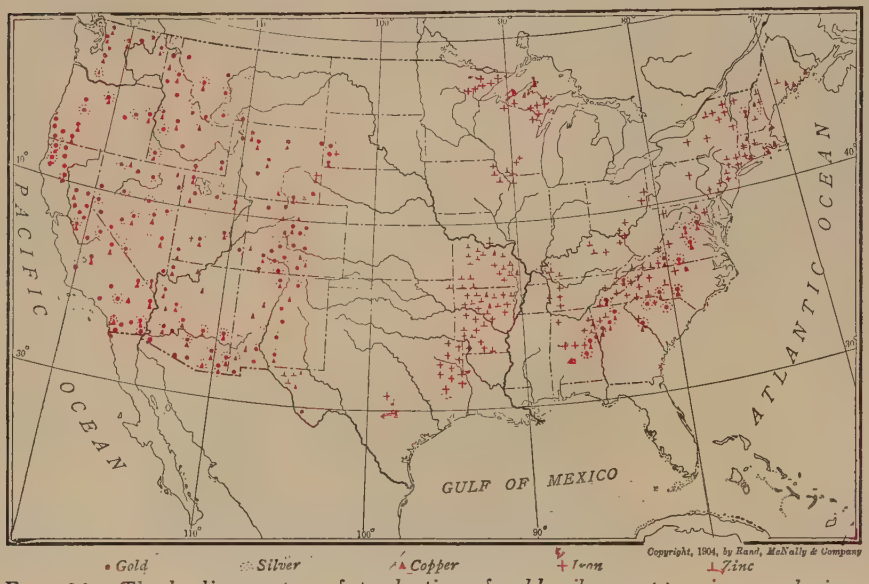


FIG. 286. *The leading centers of production of gold, silver, copper, iron, and zinc.*

Mining. The strong rocks that make up the mountain masses contain abundant supplies of valuable minerals, of which the most important are gold, silver, and copper. Colorado is first and Nevada fifth in the production of gold, and Colorado, Montana, Utah, and Idaho, in the order named, are the leading silver-producing states. Thus practically all the silver of the country is from the Plateau States. Montana is first in the production of copper; the mines at *Butte* (see Fig. 288) are the richest and the best developed in the world. Arizona is the third copper-producing state.

Lead, which is usually found in association with the silver, is also an important mineral. Idaho, Utah, and Colorado lead in its production. Coal is found in nearly all the states, but is little mined except in Colorado, where it is largely used in making coke.

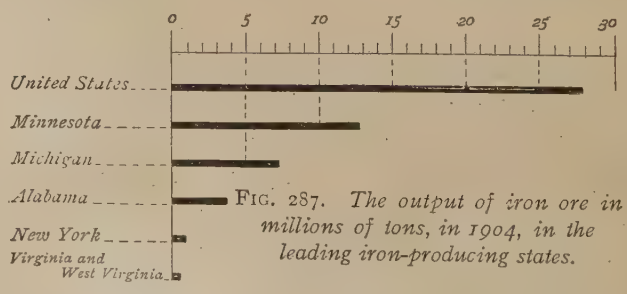


FIG. 287. *The output of iron ore in millions of tons, in 1904, in the leading iron-producing states.*

The great value of the ores has made the smelting of gold and silver of great importance at many places. *Denver* and *Pueblo*, Colo., are the leading smelting cities, though *Leadville*, Colo., at an altitude of over ten thousand feet, is important in this industry. *Cripple Creek* (see Fig. 289) and *Leadville* are the best known of the large mining towns, yet many smaller ones are found throughout the mountains. The towns are usually located on the lower slopes of the valleys, the openings to the mines dotting the hillsides. (See Fig. 286.)

Trade Routes and Cities. The principal railroads that cross the Plateau States are portions of the great transcontinental lines. Many of the mountain passes are occupied by railroads, some of which cross the mountains at an altitude of over ten thousand feet. A great circle of railroads starting from Denver connects the mining towns of southern Colorado. Branch roads connect the main lines with the mining towns in the smaller valleys, so

FIG. 288. *The copper mines near Butte, Montana.*

that the railroads are of importance not only as routes for through freight, but also for their supplies of ore which they bring to the larger cities for smelting.

Owing to the fact that the commerce between the different states of this region is small, there is but one railroad running north and south. This route extends from *Butte*, Mont., southward to Utah, but it is not so important as the lines connecting the East with the Pacific Coast. A new road has been completed across the desert from *Salt Lake City*, Utah, to *Los Angeles* and San Pedro Bay, Cal., giving another outlet to the East for the products of southern California.

FIG. 289. *Cripple Creek, Colorado.*

The larger cities of this group of states are distributing centers for the mining towns, receiving the ores and sending in return necessaries in the way of mining supplies and food. The chief city of this group of states is *Denver*, Colo., situated at the eastern foot of the Rocky Mountains and having excellent railroad connections with the East. It is an important railway center. Within a few miles are *Pueblo*, Colo., a smelting city, and *Colorado Springs*, Colo., a noted health and scenic resort. Arizona and New Mexico contain no large cities. *Santa Fe*, in New Mexico, an interesting old Spanish town, is the oldest city in the United States, though it has not been occupied by white people so long as *St. Augustine*, Fla. *Phœnix* and *Tucson*, Ariz., towns of some size, are largely dependent upon their mining.

FIG. 290. *An irrigated orchard in Utah.*

East of Great Salt Lake, in a fine climate and within rich irrigated districts, are *Salt Lake City*, *Ogden*, and *Provo*, Utah. These cities, favored by their position upon transcontinental railroad lines, are growing rapidly. Salt Lake City is the home of the Mormon church and contains its Temple and its Tabernacle. Both buildings are impressive and of much interest to travelers.

Nevada is thinly populated and has no large towns. *Virginia City* and *Carson City* once were important places, owing to the wealth of the neighboring silver mines. These mines have yielded less in recent years, and the cities have lost much of their population. To the southeast is *Goldfield*, a new and important mining town near rich gold mines.

Indians. The Plateau States contain a large number of Indians, the last of the powerful tribes who possessed the country before the coming of the white men. They are unlike the Indians of former years, however, as they are no longer chiefly dependent upon the chase for their living. Some of them practice agriculture, and many have large flocks of sheep and small donkeys called burros. Many Indians secure a good living from the region where they dwell, living in respectable homes. Certain tribes are noted for the weaving of baskets (see Fig. 291), rugs, and blankets.

In New Mexico there are many tribes of Indians who live in large towns composed of flat-roofed houses, built of sun-dried bricks made from the clay of the region. (See Fig. 88.) These villages, situated upon the hilltops, are extremely interesting and picturesque objects. Centuries ago great numbers of primitive people lived here in similar villages or *pueblos*, or in houses built in the recesses under cliffs. They have all disappeared, however, and to-day the only knowledge that we have of them and their manner of living is what we learn from the ruins of their houses and the implements and tools they have left behind them in their homes.

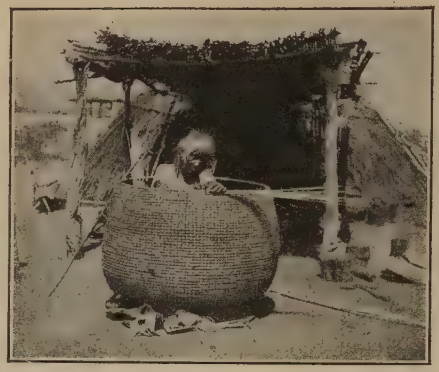


FIG. 291. *An Indian woman weaving a basket in Arizona.*

Questions and Exercises

(1) Which state in this section is the largest? The smallest? (2) Which state is most densely populated? (3) Where is the population in this state chiefly centered? Why? (4) What is the rainfall of these states? (5) How do you account for the large rivers that cross this region and the Great Plains? (6) Name the rivers that rise in the Plateau section and flow to the east. (7) What rivers do not flow out of this section? Give the reason. (8) Why are the grazing areas so thinly peopled? (9) To what cities are the sheep and cattle of this section sent to be slaughtered?

(10) Study the product maps and be able to locate on a blank map the chief products of this section. (11) State the importance of the location of Pueblo and tell why the town is a growing one. (12) What railroad facilities has it? (13) Why is Denver a railroad center?

XXXVI. THE STATES OF THE PACIFIC COAST

STATE	*Abbreviation*	*Area in sq. miles*	*Population 1910*	*Chief City*	*Population 1910*	*Capital*
Washington	Wash.	69,127	1,141,990	Seattle	237,194	Olympia
Oregon	Ore.	96,699	672,765	Portland	207,214	Salem
California	Cal.	158,297	2,377,549	San Francisco	416,912	Sacramento

The States of the Pacific Coast are everywhere mountainous, except in the large river valleys and on the small lowlands that border the Pacific in the southern part of California. The mountains are building so rapidly that in portions of this region earthquakes are frequent. In 1906 a severe earthquake caused a great destruction of property and lives in San Francisco and the immediate vicinity. Mining, lumbering, and agriculture are the leading occupations of the people.

FIG. 292. *Hydraulic mining in California.*

Mining. Mining is at present practically confined to California, next to

Colorado, the leading gold-producing state. In 1849 gold was found in the gravels of the valleys on the western side of the Sierra Nevada. (See Fig. 292.) People flocked to the diggings from all parts of the Union. As the returns from gold mining decreased the people turned their attention to other things, and began to develop lumbering and agriculture. In the production of quicksilver California leads the world, and in petroleum is the first state in the Union.

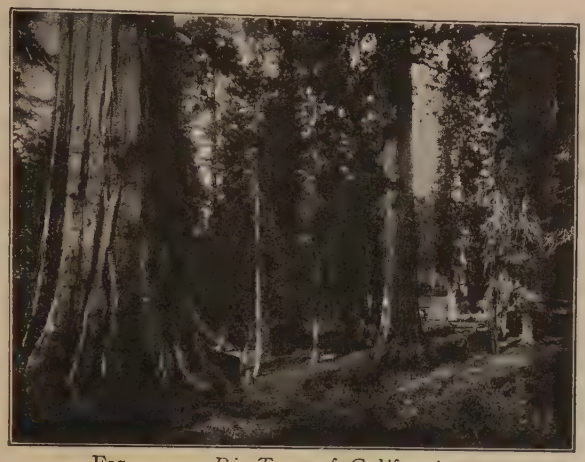


FIG. 293. *Big Trees of California.*

Lumbering. Except for the cutting of the Big Trees (see Fig. 293) and the redwoods in California, lumbering is largely confined to the two northern states. It is most important in Washington, fifth in the Union in the value of its forest products. The great fir trees, many over two hundred feet high, furnish much valuable timber which is sent to the larger towns, to be prepared for market. *Tacoma* and *Seattle*, Wash., are the great lumber towns of the West.

The Big Trees, the largest in the world, are found only in a few scattered groves in the Sierra Nevada. Some are nearly one hundred feet in circumference and over three hundred feet high. In some places they are being preserved, but in others ruthlessly destroyed for their lumber. The redwoods furnish a beautiful wood for interior decoration.

Agriculture. Certain forms of agriculture are important in Washington, Oregon, and California. The dry valleys of these states and the eastern plateaus of Washington favor the growing of wheat, barley, and sugar beets. California is the second state in the production of barley and of sugar beets. Four-fifths of the hops grown in the country are raised in these states. Oregon is the first state in production.

The most important crop of the States

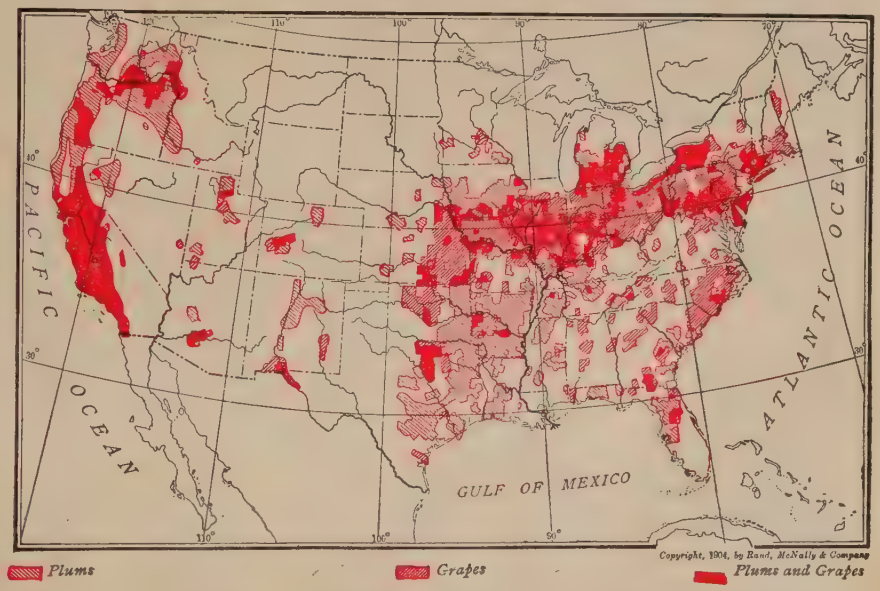


FIG. 294. *The areas of production of grapes and plums in the United States.*

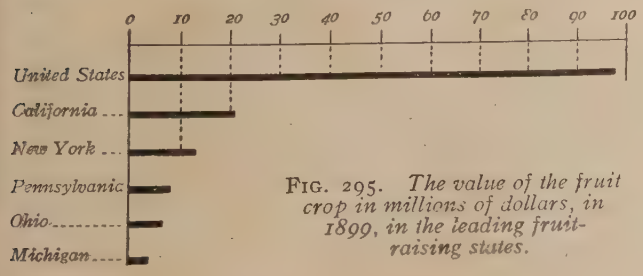


FIG. 295. *The value of the fruit crop in millions of dollars, in 1899, in the leading fruit-raising states.*

FIG. 296.

of the Pacific Coast group, however, is fruit. Owing to the subtropical climate of southern California and to the abundant sunshine and even temperature, all varieties of temperate and subtropical fruits are raised in large quantities. The success of the fruits depends largely upon the employment of irrigation, for which the near-by mountain streams furnish an abundance of water. The water is taken from the streams as they emerge from the mountains and is distributed over the lands in a series of branching channels, very much like those of a delta, though of course much smaller. (See Fig. 300.)

California is the first state in the Union in the production of temperate-climate fruits like peaches, plums, prunes, pears, apricots, and grapes. A large part of the grapes is made into wine and raisins. California leads the Union in these industries. It is also first in the raising of all kinds of subtropical fruits, except bananas and pineapples, which are not found here. It produces nearly twenty times as many oranges as Florida, practically all the lemons and olives, and a large share of the figs as well as nearly all the almonds and Eng-

lish walnuts grown in the United States. (See Figs. 294, 295, and 299.)

Some of the temperate fruits and a large part of the oranges are shipped to eastern markets fresh. A great quantity, especially of peaches, pears, and prunes, however, is canned or preserved. California is the leading fruit-preserving state in the Union.

Fishing. The rivers of the northwestern coast provide favorite spawning grounds for salmon, and therefore the catching and the curing of this fish are important industries in Washington and Oregon. (See Fig. 297.) Washington is the first state in the country in fish canning, and Oregon fifth. The canning industry is not so important, however, in either state as it is farther north in Alaska.

FIG. 299. *An orange grove in southern California.*

Manufacturing. Except for the canning and preserving of fruits, vegetables, and fish, the preparation of lumber, and the making of wine, there is little manufacturing of importance in any of the States of the Pacific Coast. A large amount of sugar is refined at San Francisco and other near by cities as at *Stockton*, Cal. The raw sugar is imported mostly from Hawaii.

FIG. 297. *Unloading salmon on the banks of the Columbia River.*

FIG. 298. *A view of the harbor at San Francisco.*

Cities and Trade. Owing to the regular form of the coast, the harbors are few and far apart along the whole length of these three states. The principal harbors are those of the two great inlets, San Francisco Bay and Puget Sound, and the harbor of San Pedro, which has been improved by the Government at large expense. Each of the cities which have developed on these inlets has transcontinental connection with the producing and consuming areas of the East, and through them pass the exports to the far East.

San Francisco, Cal., which is connected with the eastern cities by several routes and which has the best harbor (see Fig. 298), has one of the most favorable situations on the Pacific coast. Its commerce with the Old World has grown rapidly since the United States came into possession of Hawaii and the Philippines. The business portion of the city is situated on a low plain bordering the

bay, while the residence portion is located on the hills between the bay and the ocean. The city has a large Chinese population. In 1906 the business area and part of the residence section were almost destroyed by a great earthquake and fire. The city is being rebuilt and no doubt will soon again be one of the great business centers of the country.

Across the Bay of San Francisco, where the climate is a little less damp than it is in the city itself, have grown up several residence suburbs. The most important of these are *Oakland* and *Berkeley*, the seat of the University of California, one of the leading universities of the country. The growth of cities on the eastern side of the bay will probably continue, as the railroads from the east all terminate on that side of the bay, with the exception of one road, which enters San Francisco from the south.

FIG. 300. *An irrigated fruit farm in southern California.*

Sacramento, the capital of the state, and *Stockton*, both connected with San Francisco by navigable rivers, are active and growing towns. *Los Angeles*, in the southern part of the state and at the center of the subtropical fruit-growing area, has developed with great rapidity in the last few years, owing in part to the increase in the fruit industry and in part to the fact that the climate of this region is warm and dry, and therefore much liked by many people.

Portland, the port of Oregon, is the chief city of that state. It has a growing commerce and is important locally for its manufactures. The leading cities of Washington are *Tacoma* and *Seattle*, both ports of increasing importance, and *Spokane*, a manufacturing center in the eastern part of the state, situated near waterfalls which furnish excellent power. Seattle is the principal port for the Alaskan trade, and Portland has an important coastwise commerce.

Questions and Exercises

(1) On which side of the mountains are the forests heavier? Why? (2) Why are the two northern states more densely wooded than California? (3) Why is not the southern part of California so heavily forested as the northern part of the state? (4) Where is the great wheat-producing area of this section? (5) Why is Spokane called the "Minneapolis of the West"? (6) What conditions of climate make fruit growing profitable? (7) What climatic conditions are unfavorable to such growth? (9) Why are San Francisco Bay and Puget Sound so important to the Pacific Coast? (10) Draw a large map showing the location of San Francisco and surrounding towns. (11) Of what valley is it the outlet? (12) What features of location similar to New York has San Francisco? (13) What interesting sights does the city afford? (14) How is a California farm irrigated?

XXXVII. THE DEPENDENCIES OF THE UNITED STATES

The United States possesses several dependencies in different parts of the world, and a few small islands in the Pacific. The territories of *Alaska*, *Hawaii*, and *Porto Rico* are of great value to the home country because of their products, but the small islands are of little value except as cable and coaling stations in the Pacific Ocean. (See Fig. 303.)

ALASKA

Alaska was bought from Russia in 1867. It extends from the Queen Charlotte Islands to the end of the Aleutian chain, and has an area more than twice as great as the

state of Texas. The population, which is made up largely of Indians, is over sixty thousand.

Surface. The surface of Alaska is mostly mountainous. The Cordilleran Highland grows narrower here than it is to the south, but contains many high peaks, of which *Mount McKinley* (see Fig. 301) is the highest and *Mount St. Elias* the best known. Many of the peaks of the Aleutian Islands are volcanic, but are practically inactive. The northern coast of Alaska is lower than the southern, but owing to its Arctic location large areas are almost unknown. The coast is very irregular and in the south is indented by a magnificent series of fiords, in which salmon abound.

FIG. 301. *Mount McKinley, the highest mountain in North America.*

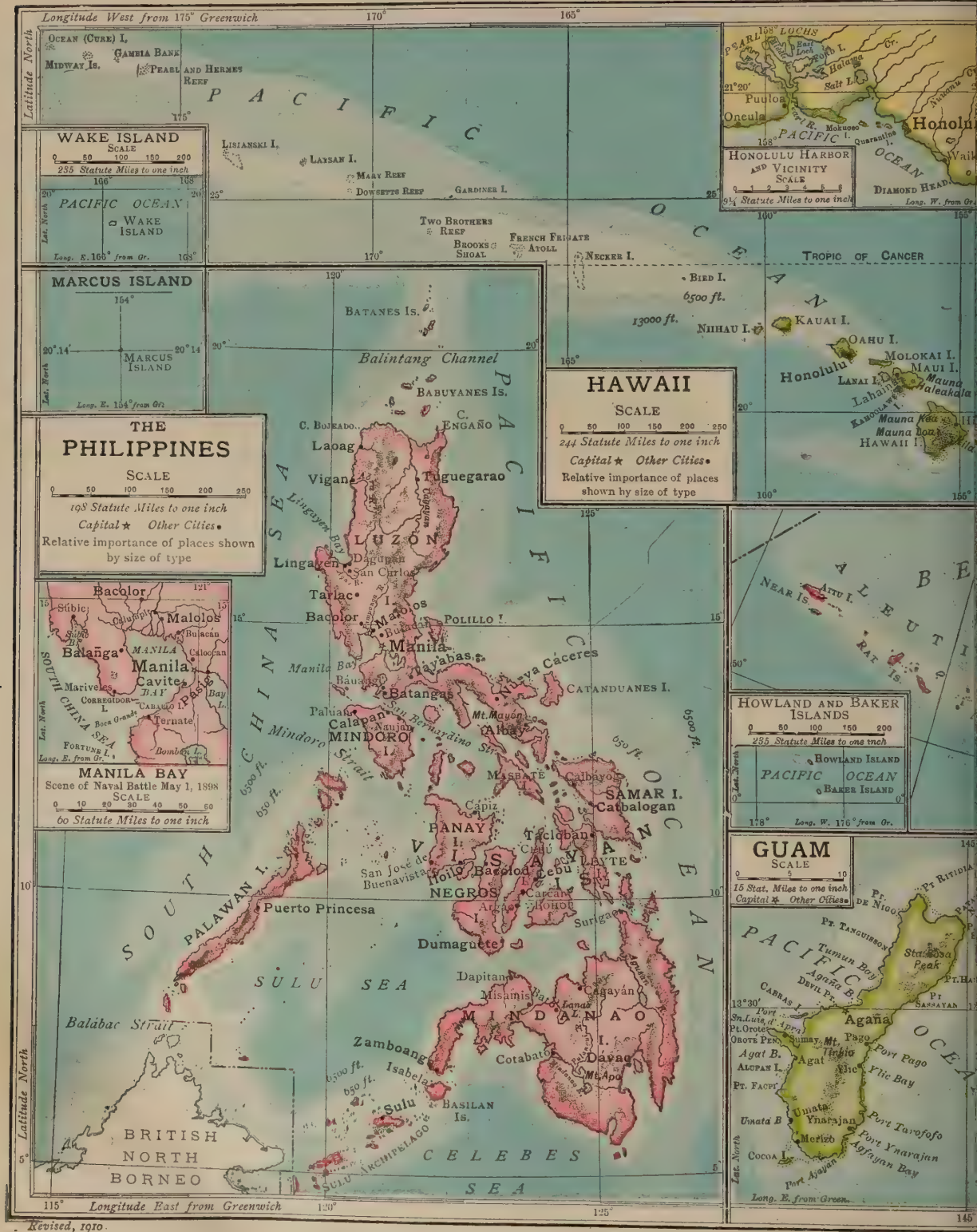
Drainage. Alaska contains several large rivers, of which the greatest, the *Yukon*, extends across the whole area. The Yukon is one of the large rivers of the continent and is an important highway for summer trade. The lands of the lower valley have so favorable a climate that they can be devoted to the raising of the more hardy cereals and vegetables. Agriculture is developing here. The principal towns of the valley are found along the eastern boundary of the territory near the cities of northwestern Canada, all of which are due to the discovery of gold in the Klondike region a few years ago. (See Fig. 304.)

FIG. 302. *The famous Treadwell gold mine as seen from the water.*

Climate and Vegetation. Alaska lies in the path of the westerly winds. It therefore has a moist and somewhat equable climate along its coast, with a rainfall greater than that in any other part of North America. Hence forests grow on the slopes of the mountains up to a height of 2,500 or 3,000 feet. In the higher altitudes glaciers are found, of which the largest is the Malaspina glacier. The best known is the Muir glacier, which reaches the sea and therefore can be readily visited.

The climate of the interior is marked by strong contrasts between the summer and the winter. In winter the temperatures are low, the rainfall slight, and the ground may be frozen to a depth of over one hundred feet. In summer the temperature is relatively high, the surface soil melts, and the ground is covered with vegetation which reaches up the mountains to a height of several thousand feet. The northern portion lies in the tundra region, and is therefore devoid of the larger forms of vegetation found farther to the south. (See Fig. 119.)

Products. The rocks of the mountains of Alaska abound in minerals, and gold has been found in great quantities in the beach and river gravels. Hence mineral wealth is the greatest natural resource of the country. Coal is also widely distributed, but it


Longitude West from 175° Greenwich
Latitude North
PACIFIC OCEAN
Ocean (Cure) I.
Gambia Bank
Midway Is.
Pearl and Hermes Reef
WAKE ISLAND
Scale
0 50 100 150 200
235 Statute Miles to one inch
PACIFIC OCEAN
Wake Island
Long. E. 166° from Gr.
Lisianski I.
Laysan I.
Maary Reef
Dowsetts Reef
Gardiner I.
Two Brothers Reef
Brooks Shoal
French Frigate Atoll
Necker I.
Tropic of Cancer
MARCUS ISLAND
Marcus Island
Long. E. 154° from Gr.
Batanes Is.
Balintang Channel
Babuyanes Is.
C. Engaño
C. Bojeador
Laoag
Vigan
Tuguegarao
Cagayan
THE PHILIPPINES
Scale
0 50 100 150 200 250
198 Statute Miles to one inch
Capital ★ Other Cities •
Relative importance of places shown by size of type
LUZON
Lingayen
Dagupan
San Carlos
Tarlac
Bacolor
Malolos
Polillo I.
Manila
Manila Bay
Cavite
Batangas
Lucena
Cáceres
CATANDUANES I.
Paluan
Calapan
Naujan
MINDORO
Mt. Mayon
Albay
Mindoro Strait
MASBATE
Calbayog
SAMAR I.
Catbalogan
Capiz
PANAY
Tacloban
Leyte
Iloilo
Bacolod
Cebu
NEGROS
Carcar
Argao
Surigao
PALAWAN I.
Puerto Princesa
Dumaguete
SULU SEA
Dapitan
Misamis
Cagayán
MINDANAO
Balábac Strait
Zamboanga
Cotabato
Davao
Mt. Apo
Isabela
Sulu
BASILAN Is.
BRITISH NORTH BORNEO
CELEBES SEA
SULU ARCHIPELAGO
SOUTH CHINA SEA
Longitude East from Greenwich
Revised, 1910.
MANILA BAY
Scene of Naval Battle May 1, 1898
Scale
0 10 20 30 40 50 60
60 Statute Miles to one inch
Bacolor
Malolos
Balanga
Manila
Cavite
Mariveles
Corregidor I.
Caballo I.
Ternate
Fortune I.
Bombon L.
Bulacan
Caloocan
Pasig R.
Bay
Boca Grande
Long. E. from Gr.
HAWAII
Scale
0 50 100 150 200 250
244 Statute Miles to one inch
Capital ★ Other Cities •
Relative importance of places shown by size of type
Bird I.
6500 ft.
13000 ft.
Niihau I.
Kauai I.
Oahu I.
Molokai I.
Maui I.
Honolulu
Lanai I.
Lahaina
Kahoolawe I.
Mauna Kea
Mauna Loa
Hawaii I.
Mauna Haleakala
Long. W. from Gr.
HONOLULU HARBOR AND VICINITY
Scale
0 1 2 3 4 5 6
6¼ Statute Miles to one inch
Pearl Lochs
West Loch
East Loch
Ford I.
Halawa
Salt L.
Puuloa
Oneula
Pearl R.
Mokuoeo
Quarantine I.
Honolulu
Waikiki
Diamond Head
ALEUTIAN Is.
Attu I.
Near Is.
Rat Is.
HOWLAND AND BAKER ISLANDS
0 50 100 150 200
235 Statute Miles to one inch
Howland Island
Baker Island
Long. W. 176° from Gr.
GUAM
Scale
0 5 10
15 Stat. Miles to one inch
Capital ★ Other Cities •
Pt. Ritidia
Pt. de Nigo
Pt. Tanguisson
Tumun Bay
Agaña B.
Devil Pt.
Cabras I.
Stalagosa Peak
Pt. Sasnayan
Agaña
Pago
Agat B.
Agat
Alupan I.
Pt. Facpi
Port Pago
Flic Bay
Umata B.
Umata
Ynarajan
Merizo
Cocos I.
Port Tarofofo
Port Ynarajan
Agfayan Bay
Port Ajayan
Long. E. from Green.

FIG

ALASKA
SCALE
0 50 100 150 200 250 300 350
312 Statute Miles to one inch
Capital ★ Other Cities •
Relative importance of places shown by size of type
Longitude West from Greenwich
Latitude North
ARCTIC OCEAN
Pt. Barrow
Wrangell I.
C. Lisburne
Pt. Hope
Kotzebue Sound
Cape Deshnef
Gulf of Anadyr
Bering Strait
C. Prince of Wales
Nome
C. Nome
Norton Sound
St. Michael
St. Lawrence I.
St. Matthew I.
C. Romanzof
Nunivak I.
Kuskokwim Bay
C. Newenham
Pribilof Islands
Unimak I.
Unalaska I.
Fox Islands
Umnak I.
Shumagin Is.
Sannak Is.
6500 ft
13000 ft
BERING SEA
BRISTOL BAY
PACIFIC OCEAN
Noatak R.
Kowuk R.
Kowuk
Kotzebue
Buckland R.
Selawik L.
Selawik
Kobuk R.
Kobuk
Koyukuk R.
Koyukuk
Yukon R.
Yukon
Tanana R.
Tanana
Nulato
Kaiyuh Mts.
Fort Yukon
Porcupine R.
Rampart
Tanana Hills
Fairbanks
Eagle
Circle
Klondike
Dawson
Klondike Region
Mackenzie R.
Peel R.
Rocky Mts.
Dominion of Canada
Mt. McKinley
Mt. Foraker
Mt. Wrangell
Mountains
Fr. Selkirk
Lewes R.
White Horse Rapids
L. Teslin
Logan
Mt. St. Elias
Mt. Cook
Malaspina Glacier
Yakutat Bay
Mt. Fairweather
Prince William Sound
Skagway
Douglas
Juneau
Chichagof I.
Sitka
Baranof I.
Alexander Archipelago
Prince of Wales
Dixon Entrance
Wrangell
Stikine R.
Queen Charlotte Islands
Kenai Peninsula
Afognak I.
Kodiak
Kodiak I.
C. Trinity
Cook Inlet
Shelikof Strait
Alaska Peninsula
Kuskokwim Bay
L. Clark
L. Iliamna
Aleutian Islands
Unalaska
Sannak
Shumagin Is.
Umnak I.
Fox Islands
Unalaska I.
Pt. Barrow
Romanzof Mts.
Mackenzie R.
Porcupine R.
Yukon R.
Tanana R.
Kuskokwim R.
Noatak R.
Kotzebue Sound
Bering Strait
Cape Deshnef
Gulf of Anadyr
St. Lawrence I.
St. Matthew I.
Nunivak I.
Kuskokwim Bay
C. Newenham
Pribilof Islands
Unimak I.
Unalaska I.
Fox Islands
Umnak I.
Shumagin Is.
Sannak Is.
6500 ft
13000 ft
Bering Sea
Bristol Bay
Pacific Ocean
Gulf of Alaska
Prince William Sound

is generally almost inaccessible, but because the cost is reasonable it is mined only along the coast. Gold and silver ore form the most valuable export. For many years it has been

FIG. 304. *An Alaskan village.*

secured from the rocks about *Juneau*, so that a large town, dependent upon this industry, has grown up there. The discovery of gold on the Yukon and at Nome has added much to the wealth and population of Alaska. The gold-bearing gravels of the Yukon are richer in Canada, however, than they are in Alaska. (See Fig. 302.)

The second industry in rank in Alaska is fishing. Salmon are caught in great numbers in the estuaries of the western coast, as they are farther south in the United States. Most of the salmon are canned, and Alaska produces annually more than ten million dollars worth of canned salmon, an amount far greater than is produced in Washington, the leading state of the Union in this industry.

The third product of Alaska is furs. When Alaska belonged to Russia its chief product was furs, secured largely from seals found on the Pribilof Islands. Since 1890 the supply of skins has rapidly decreased, owing to the practical destruction of the seal herds and the present annual output of furs has only about one-tenth the value of the salmon.

Cities. The largest permanent settlements are at *Sitka* and *Juneau*, the seat of the territorial government. Sitka, built on Baranof Island, is an interesting village, and is the oldest town in the territory. It contains an interesting Greek church, built during the Russian possession of the region, and is much visited by tourists annually.

Trade. The trade of Alaska is principally with the United States. The exports are chiefly gold, dried and cured fish, fish oil, and whalebone. In return Alaska receives from our country iron and steel goods, tinware, meat and dairy products, breadstuffs, wearing apparel, and explosives; that is, the larger part of the necessaries of life have to be imported. It is not at all probable that the resources of Alaska can be developed so that the food and provisions necessary to supply the needs of the population, which is engaged in fishing and mining, can be grown within the borders of the country.

HAWAII

About one-third of the way across the Pacific Ocean, and lying within the Hot Belt, is a group of eight inhabited islands and several rocky islets, known as the *Hawaiian Islands*, or *Hawaii*. (See Fig. 303.) These islands have belonged to the United States since 1898. They have a combined area about as large as that of the state of Connecticut, and

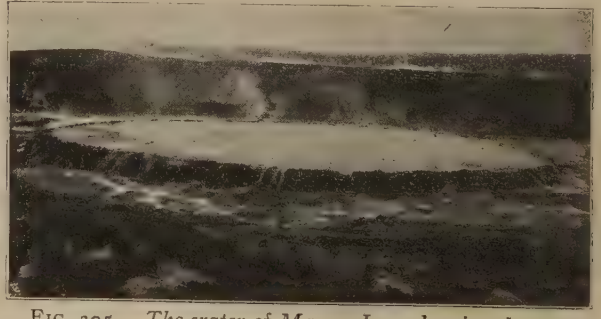


FIG. 305. *The crater of Mauna Loa, showing the steam and vapors rising from it.*

a population of over 190,000. The largest island is Hawaii. The most populous is Oahu, which contains *Honolulu*, the largest city. More than half the population is Japanese and Chinese, though the white

people are rapidly increasing; the native Hawaiians are decreasing.

Surface. The Hawaiian Islands are mountainous and extremely volcanic. The chief

FIG. 306. *Loading sugar cane in one of the large Hawaiian sugar cane plantations.*

volcanoes are *Mauna Kea* and *Mauna Loa* (see Fig. 305), each with an altitude of over 13,500 feet. On the slopes of *Mauna Loa* is the volcano of *Kilauea*, a great seething lake of lava which once in about every twelve years overflows. The eruption of this volcano has none of the violent features which are usually associated with volcanic eruptions. The lava simply wells up and flows down across the country, burning and destroying everything in its path. The volcanic rock weathers rapidly in the moist, tropical climate, and makes an extremely fertile and productive soil.

Climate. Owing to the influence of the ocean the range of temperature in the Hawaiian Islands is only about ten degrees, which is lower than in any other region in a similar latitude. There are only two seasons, winter and summer, with the greatest rainfall in the winter.

Products; Trade; Cities. Hawaii is the fourth largest producer of cane sugar in the world. Sugar is the leading crop. (See Fig. 306.) Its output is now greater than that of Louisiana. Rice and bananas are raised in large quantities. Hawaii raises bananas for commerce and produces more rice than Texas, the leading rice-producing state of the Union. Stock raising is an important occupation on the higher slopes, where crops cannot be so readily grown.

More than nine-tenths of the exports of the Hawaiian Islands goes to the United States. Sugar, sent to California for refining, has the leading place. The imports are also received chiefly from the United States, and include breadstuffs, machinery, cotton manufactures, lumber, and provisions.

Owing to their position the islands form an important calling place for Pacific steamers. They are connected with one another by a well-developed system of wireless telegraphy, and are connected with America and the continent of Asia by a cable finished in 1903.

Honolulu, the capital and largest city, is a modern town, with electric cars and electric lights. It is well provided with wharves for the accommodation of the large and increasing trade.

THE PHILIPPINES

The Philippines, which have been possessions of the United States since 1898, are the most numerous group of islands southeast of Asia. (See Fig. 303.) They include 3,141

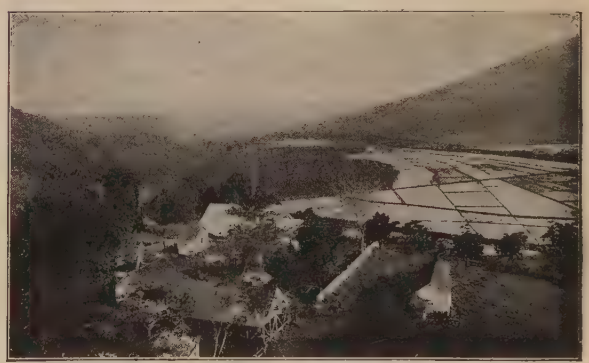


FIG. 307. *Rice field in the Philippines.*

islands and islets, with an area about equal to that of Arizona. Two-thirds of this area is in the larger islands, *Luzon* and *Mindanao*. The population is now more than seven millions, of which the larger part belongs

to the brown race. Europeans are found in all the leading cities, and are rapidly increasing in numbers.

Surface. The surface of the Philippines is generally mountainous and volcanic, with some peaks rising over 10,000 feet. Extensive lowlands exist in the two larger islands, and it is in these districts that agriculture is best developed.

Climate and Vegetation. The climate is everywhere tropical on account of the location of the islands. In *Manila*, the chief city, the temperature never goes below 59° or above 90°. The nights are generally cool, so that the warmth of the days is not so oppressive as in those regions where there is but little difference between the temperatures of day and night. The islands are swept by both monsoons, and the rainfall is therefore abundant during each season. The rainfall in the northern islands occurs mostly during the prevalence of the northeast trade wind, and in the southern islands at the opposite season. Therefore the period of planting and harvest, which depends upon the rainfall, differs in the two sections.

FIG. 308. *Loading manila hemp rope to carry to the ships for transportation.*

Owing to the warmth and the moisture of the climate, the vegetation is very dense, and in many places tropical jungles abound. Because of the density of the vegetation, traveling in the country is carried on with difficulty.

Products. The chief products of the Philippines are tropical in their nature; they include hemp, sugar, coffee, cocoanuts, tobacco, and indigo. Rice is raised extensively in the more favorable regions, but is all used at home as food for the people. (See Fig. 307.) The forests abound in cabinet and dye woods, but they have been little developed as yet, owing to the difficulties and the cost of getting the products to market.

The islands are rich in minerals, including gold, coal, copper, silver, and lead, but mining, like agriculture, has not as yet been developed as it can be.

Trade; Cities; Development. The principal part of the trade of the Philippines is with the United Kingdom, Hong-kong, Japan, France, and Spain. The United States receives nearly one-half of the exports, of which manila hemp is the chief. (See Fig. 308.) The principal imports are cotton goods, hardware, and machinery from the United Kingdom. At present the imports from the United States are increasing, but our country furnishes only about one-sixth of all the goods received in trade.

The chief ports are at *Manila* and *Iloilo*. Manila has the best harbor and it can be made the equal of any of the harbors of the Pacific. (See Fig. 309.) The islands are now connected with Asia and with the United States by cables.

OTHER ISLANDS OF THE PACIFIC

The United States possesses a number of small islands in the Pacific, which are or may be important as cable and coaling stations. Chief of these are *Guam*, the largest of the Marianne (Ladrone) Islands, and *Tutuila*, in the Samoa group. The others are *Howland*, *Baker*, *Wake*, *Midway*, and *Marcus* islands.

Guam, with an area of about two hundred square miles, is occupied mostly by descendants of immigrants from the Philippines. It raises some cocoanuts for commerce.

Tutuila is the only possession of the United States in the Southern Hemisphere. It contains the port of *Pago-Pago*, one of the best harbors of the Pacific Ocean, and is therefore an exceedingly valuable coaling station.

FIG. 309. *A general view along the Pasig River, Manila, showing the shipping of this port.*

PORTO RICO

Porto Rico, one of the larger islands of the West Indies, is about three and a half times as large as Rhode Island, and contains a population of more than a million. It has a density of population surpassing all the states of the Union except Rhode Island and Massachusetts. The people are mostly of Spanish descent or are negroes.

Surface and Climate. The surface of Porto Rico is rolling and diversified with mountains rising along the axis of the island to a height of over 3,000 feet. There are extensive plains near the coast which are devoted to agriculture.

Porto Rico lies in the northerly trade-wind belt, and therefore has an abundant rainfall, especially in the north. The heavy rainfall provides an ample supply of water to the rivers, so that the region is well watered. The lower portions of the rivers are navigable for small vessels.

FIG. 310. *The harbor of San Juan, the capital and chief city of Porto Rico.*

Products. Owing to the warmth and the moisture, the slopes of the island are covered with forests, which contain valuable supplies of cabinet woods, as do the forests of the other Caribbean regions.

Sugar, tobacco, coffee, and tropical fruits are the leading agricultural products. Two-thirds of the trade is with the United States. It includes sugar and cigars. France ranks next in the amount of commerce. The imports are almost entirely from the United States, and include cotton goods, machinery, hog products, and flour.

The chief towns are the ports of *San Juan* (see Fig. 310) and *Ponce*.

Questions and Exercises

(1) Find out what you can about one of the three great industries of Alaska. (2) Locate the places where these industries are centered. (3) Describe the route by which the products of Alaska reach Chicago or Washington. (4) Find out when Sitka ceased to be a Russian town.

(5) What tempers the climate of the Hawaiian Islands? (6) What objects of interest does a stranger find in these islands? (7) What steamer lines stop at Honolulu? (8) Why is sugar refining a large business at San Francisco? (9) What is the latitude of the Hawaiian Islands? (10) Locate the Philippines. (11) How does their climate differ from that of Hawaii? (12) What islands of North America are visited by tropical cyclones? (13) What can you say of the future prospects of our islands in the Pacific as regards trade and other industries?

(14) On an outline map of the world locate all the dependencies of the United States and draw commercial routes between them and this country. Show the cable lines. (15) When it is noon on Monday at San Francisco tell what day and time it is at Manila. Write this on map.

Summary

With the development of the last few years and the increase in possessions outside of the United States proper, our country has become one of the great world powers, ranking with the leading nations of Europe. The progress of the country has been largely due to the favorable conditions for the development of agriculture, manufacturing, and commerce. The vast areas of fertile soil in the central states, lying in a climate favorable to agriculture, has made it possible for the country to become the home of millions of people from the European nations. The development of the agricultural possibilities has created a great wealth of breadstuffs and provisions available for commerce. The United States has therefore become the principal country furnishing food to Europe.

The almost inexhaustible resources of iron and coal, and the development of cotton raising in the South, have made the United States one of the greatest manufacturing countries of the world.

The location of the United States across the smaller ocean from the leading nations of Europe, and the fact that it is well supplied with large and commodious harbors, accessible throughout the year, have favored the development of Atlantic commerce. The numerous water gaps through the Appalachian Highland, and the natural highways of commerce to the South and Southwest, have made it possible to transport the products of the interior to the eastern ports cheaply and rapidly. The development of the water commerce along the Great Lakes has also been of great importance commercially.

The commercial cities along the Pacific Coast are now developing rapidly, owing to the increase in commerce with our possessions in the Pacific and the greater ease in getting to the ports of the Far East.

Because of these many favoring conditions, the United States is now the third commercial country in the world, having more than ten per cent of the world's trade. It is exceeded in its exports only by the United Kingdom, though it is closely followed by Germany. In its imports it is exceeded by both the United Kingdom and Germany. Its principal trade is with these two countries, Canada (see Fig. 314) and France.

The chief exports are cotton, provisions, breadstuffs, iron and steel goods, and mineral oil. The principal manufactured products sent in trade are, in the order of their importance, iron and steel goods, refined oils, cotton goods, leather, and agricultural implements.

Manufactured products form about sixty per cent and agricultural products about thirty per cent of the exports of the United States. The principal products of the soil, in the order of their importance in trade, are wheat, flour, corn, cattle and hog products, and cotton. More than one-half the manufactured products are sent to Europe and one-fourth to other countries of North America.

The chief imports are products that cannot be produced at home, either because of the climate or because the country has not developed its possibilities in certain lines because of the far greater opportunities in the lines generally followed. The principal imports are from the warmer countries and include sugar from the West Indies and Cuba, coffee from Brazil and Central America; vegetable fibers from Mexico, the Philippines, and India; chemicals, drugs, and dyes; hides and skins from Europe and South America; silk from Japan, Italy, and China; rubber from Brazil and Europe; tea from China and Japan.

Among the other imports are laces from the United Kingdom, Germany, and Switzerland; wool and woolen goods from the United Kingdom; diamonds; silk goods from France; and tin from the United Kingdom and the East Indies.

XXXVIII. COUNTRIES OF NORTHERN NORTH AMERICA

Ownership and Area. Northern North America comprises the *Dominion of Canada*, *Newfoundland*, *Greenland*, and *Alaska*. (See Fig. 312.) Alaska belongs to the United States; Greenland is owned by Denmark; Newfoundland, which includes the island of that name and a narrow strip of land along the eastern coast of Labrador, belongs to the United Kingdom. All the rest of northern North America is included in the Dominion of Canada, a colony of the United Kingdom.

THE DOMINION OF CANADA

Area and Population. The Dominion of Canada constitutes by far the largest and most important dependency of the British Empire in the Western Hemisphere. The area of Canada is a little larger than that of the United States, but the population is only a little over 5,000,000, or about three-fourths the population of New York state.

FIG. 311. *A glacier in British Columbia.*

Coast Line. The coast line of Canada is irregular on both oceans (see Fig. 312), but the valuable harbors are few, owing to the fact that during the winter months most of the Atlantic harbors are closed by ice. (See Fig. 82.) The harbors of the Pacific Coast are never icebound, but they do not as yet rank with the Atlantic ports for the reason that they are not so favorably situated for receiving agricultural products and for sending them to countries which are deficient in food supplies.

Surface. The northern extremity of the Appalachian Highland includes New Brunswick and Nova Scotia. Rugged ranges of hills run nearly northeast and southwest and occupy a large part of the area of these two provinces, being most pronounced in New Brunswick. These uplands are largely in a wild state and for much of their extent are little known. Rich lowland valleys lie between the ridges and form the regions of densest population.

North of the St. Lawrence and southeast of Hudson Bay is the Labrador Plateau. It is a low, rocky, thin-soiled plateau, the highest portion forming a divide for streams which flow outward in every direction. The hilly eastern lowlands of western Quebec and northern Ontario have been heavily glaciated and abound in lakes and waterfalls.

The fertility of the soil and the richness of the lowlands along the St. Lawrence and the Great Lakes, are indicated by the fact that almost three-fourths of the population of Canada is found in Quebec and Ontario, which lie in this region. The richest farming lands, perhaps in the world, are in Manitoba and Saskatchewan.

West of the area drained by the St. Lawrence River and the Great Lakes, and extending to the foothills of the Cordilleran Highland, is the Great Central Plain, the northern continuation of the Great Central Plain of the United States. (See Fig. 173.)

The Cordilleran Highland occupies the whole region between the Great Central Plain and the Pacific Ocean, and reaches its maximum altitudes near the boundary of Alaska. It consists of many different ranges, contains many great glaciers, and is renowned for its magnificent scenery. (See Fig. 174.)

FIG. 312.

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Drainage. The principal river of Canada is the *St. Lawrence*, which drains the five *Great Lakes*. (See Fig. 312.) The basin of this river is the great highway for Canadian trade, and is increasing in importance each year, owing to the greater use of the canals which have been built around the rapids in the St. Marys River at Sault Ste. Marie.

The *Mackenzie River* is one of the long rivers of America, but it drains a region of little value on account of the climate, and hence is of little importance. The *Yukon River*, the other great river of northwestern America, is navigable to the Klondike gold fields in the northwestern corner of the Dominion, and is an important highway of commerce in the summer time, not only for the Territory of Yukon but for Alaska.

FIG. 313. *The water front at Montreal, the chief commercial city of Quebec.*

Of the western rivers which break through the ranges of the Cordilleran Highland the *Fraser* and the *Columbia* are the largest. They are not available for water commerce, but their valleys offer the best routes across the mountain ranges, and are therefore much used in travel and transportation.

Climate. The climate of Canada is continental, and is therefore characterized by wide variations in temperature. The country may be divided according to its climate into three great divisions: the southeastern portion, the interior, and the western coast. The southeastern portion extends west nearly to Winnipeg, and is characterized by a great seasonal range of temperature and by ample rainfall during the summer months. (See Figs. 82 and 84.) The spring is late along the eastern coast because the inblowing winds pass over a cold portion of the ocean, and therefore bring little warmth.

The interior region, extending from near Winnipeg to the eastern slopes of the Cordilleran Highland, is cold in winter and is fairly warm and dry in summer. It warms up in the spring much more rapidly than the eastern section.

The Pacific slopes of the Cordilleran Highland have a moderate range of temperature and are extremely moist. The rainfall is heavy, as it is both to the south in the western portions of Washington and Oregon and to the north along the Alaskan coast and the Aleutian Islands. (See Fig. 97.)

Plants and Animals. The tundra area of Canada, with its low shrubs and abundant mosses, is commonly known as the "Barren Lands" and sometimes as "The Land of Little Sticks." It covers all of northern Canada as far south as a line extending from the mouth of the Mackenzie River southeast to Fort Churchill on Hudson Bay and then east through Ungava. South of the tundra area is a great forest region which covers the larger part of the Dominion and extends into the United States. (See Fig. 119.)

In the southeastern provinces the forests in the lower lands have been extensively cleared to furnish land for agriculture. Those along the Ottawa River are an important source of supply of wood pulp for the making of paper, and the forests of New Brunswick yield valuable timber products.

This forest region is the home of many fur-bearing animals which are hunted for the sake of their skins.

The most characteristic animals of Canada are the caribou, which are often seen in great herds, and the musk ox, which is found nowhere else in North America. (See Fig. 140.)

Trade. The Dominion of Canada has about one-eighth of the commerce of North America,

which is carried on chiefly with the United Kingdom and the United States. The larger part of the exports goes to the United Kingdom, but more than one-half of the imports are received from the United States. The chief exports to the United Kingdom are animal products, timber, and wheat. Wood and timber, fish, and copper are shipped to the United States. The imports are chiefly iron and steel, coal, breadstuffs, and cotton. Canada is the largest exporter of cheese in the world, and has some of the largest and most important fisheries.

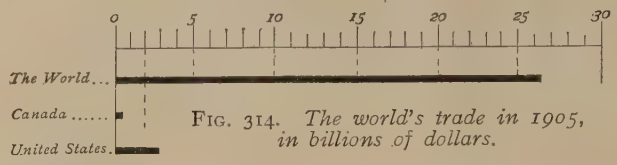

FIG. 314. *The world's trade in 1905, in billions of dollars.*

NOVA SCOTIA, PRINCE EDWARD ISLAND, AND NEW BRUNSWICK

Surface and Coast Line. The surface of Nova Scotia, Prince Edward Island, and New Brunswick is extremely varied, as might be expected from the fact that the Appalachian Highland occupies a large part of this region. The coast line is irregular (see Fig. 312) and its indentations contain several excellent harbors; commerce is impeded, however, by the great prevalence of fogs, especially in the summer months.

Occupations. The lowlands of the interior of Nova Scotia and Prince Edward Island are devoted to agriculture; grain, apples, and potatoes are the chief crops. Dairying and the raising of horses for the British market are the other leading occupations of the interior. Nova Scotia is rich in coal, some of which can be readily mined and shipped because of the close proximity of the mines to the sea. Lumbering is the most important industry of New Brunswick.

FIG. 315. *The fishing village of Cape Breton.*

Owing to the nearness of Nova Scotia, Prince Edward Island, and New Brunswick to the great fishing grounds of the continental shelf, fishing, especially for cod, lobsters, and herring, is the leading occupation in the coast towns. (See Fig. 315.) The fishing privileges over the Grand Banks are shared with the United States and France. Fishing is the most important industry in Nova Scotia and Prince Edward Island, and ranks second in New Brunswick.

Cities. *Halifax*, situated on the finest harbor in Nova Scotia, is the most important naval and coaling station of the United Kingdom on the continent of North America. *Sydney*, on Cape Breton Island, has the largest iron and steel works in the Dominion.

St. John, the largest city in New Brunswick, is favorably situated on a large harbor which opens into the Bay of Fundy. This harbor is free from ice the year round, and its trade with the United Kingdom is constantly increasing.

QUEBEC

Description. The Province of Quebec includes most of the fertile valley of the St. Lawrence River and the southern part of the barren Labrador Plateau. The wilderness of northern Quebec is a favorite fishing and camping country for sportsmen. The Saguenay River is a magnificent fiord, world-renowned for the splendor of its scenery, and visited annually by large numbers of tourists. The highland area of southern Quebec, like that of northern New Brunswick, is visited by

FIG. 316. *Rafts of logs on the St. Lawrence River at Quebec.*

many sportsmen and fishermen during the summer months.

Industries. The larger portion of the population of the Province of Quebec is in the valley of the St. Lawrence. Northern Quebec has only small, scattered settlements, found in the small valleys, where a fair living can be secured by means of agriculture.

FIG. 317. *The parliament house at Quebec.*

Most of the people of the province are engaged in tilling the soil. The chief crops are cereals, hay, tobacco, and fruits, although great quantities of cheese and butter are made, and a large number of horses are raised. Lumbering is the second occupation in importance and is constantly growing because of the prevalence of the valuable soft white pine, the supply of which throughout the northern United States is being rapidly exhausted. (See Fig. 316.)

Cities. *Quebec*, the capital and the oldest city of the province, is beautifully situated, partly on and partly at the foot of a bluff facing the St. Lawrence. (See Fig. 317.) These heights at the head of the St. Lawrence estuary, and the former head of navigation, furnished the best possible situation for a fortified town. Hence the old city was built on the bluff. Quebec was formerly the chief commercial city of the province because of its location. In late years it has yielded that supremacy to Montreal, because the St. Lawrence has been so deepened that ocean-going vessels can reach the latter city.

Montreal, with a population more than four times as great as that of Quebec, is the largest city in the Dominion. It is also the chief commercial city, both for water and land transportation, since it is an important railroad center, and the terminus for the Great Lakes steamship lines. (See Fig. 313.)

ONTARIO

Climate and Soil. Ontario includes the portion of the St. Lawrence Valley west of Quebec and the Canadian portion of the Basin of the Great Lakes. It extends as far south as northern Pennsylvania and as far north as Hudson Bay. The summer climate is warm and the soil is well watered. (See Fig. 84.) The coast along the Great Lakes, except Lake Huron, is low, and forms good farming land. The northern shore of Lake Huron is high and rugged. Owing to the gentle slopes, favorable climate, and fine glacial soils, the

FIG. 318. *A fruit farm in southern Ontario.*

region bordering Lake Erie is extremely fertile, and is often called the "Garden of Canada." (See Fig. 318.)

Products; Cities. Wine, table grapes, apples, wheat, oats, and beans are the chief agricultural products. Ontario leads all the provinces in the making of cheese. The mineral deposits include rich copper and nickel fields along the north shores of Lake Huron and Lake Superior.

FIG. 319. *A barley crop ready for shipment in Manitoba.*

FIG. 320. *A sawmill and lumber yard near Ottawa.*

Ottawa, the seat of the Dominion government, is the center of a large lumber trade, and has the largest sawmills in Canada. (See Fig. 320.) *Toronto*, on the north shore of Lake Ontario, is the commercial center of the province and an important railway terminus. It is also the seat of the provincial government of Ontario. *Port Arthur*, on the northern coast of Lake Superior, is the chief outlet for the wheat from Manitoba and the Canadian Northwest.

MANITOBA

Surface. The eastern portion of Manitoba is rocky and contains many lakes, of which Lake Winnipeg is the largest. More than half the province lies in the level plain of "Lake Agassiz," which existed during the time when the great continental glacier occupied northern Canada and shed its waters into this basin. The outlet of the lake was through the Minnesota River into the Mississippi. Now the waters have drained away, and the level lake floor forms one of the most perfect plains in the world.

The western portion of Manitoba consists of a prairie rising eight to twelve hundred feet above the plain, and deeply cut by valleys made by the east-flowing rivers.

FIG. 322. *Main Street and City Hall Square, Winnipeg.*

Products; Cities. Oats and barley are raised extensively on the prairies, though the soil and climate are not so favorable for agriculture as in the lake plain. Wheat is the leading crop in the lake plain, as it is to the south in Dakota and Minnesota. (See Figs. 178, 179, 319, and 321.)

FIG. 321. *Stacks of wheat on the level prairie land of Manitoba.*

Winnipeg, at the junction of two navigable rivers, is the

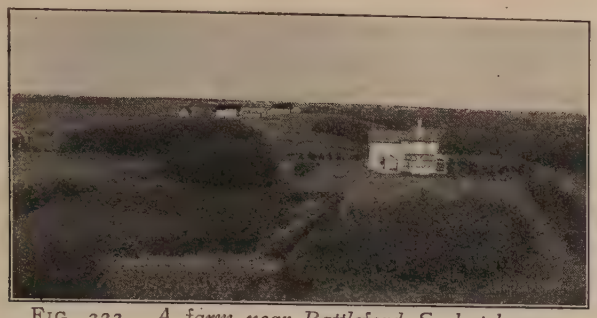

FIG. 323. *A farm near Battleford, Saskatchewan.*

chief town and railway center. Railroads radiate from it into the northwest as well as the south and west, so that the larger portion of the wheat sent eastward to Port Arthur and Port William for shipment over the Great Lakes passes through this city. (See Fig. 322.)

BRITISH COLUMBIA

Surface; Coast Line; Scenery. British Columbia is the largest province in the Dominion and is mostly occupied by the Cordilleran Highland. The coast line is extremely irregular and is bordered by magnificent fiords and guarded by a great series of offshore islands. The highland region, with its magnificent canyons, extensive glaciers, beautiful glacial lakes, and steep-sloped mountains, is one of the grandest scenic regions of the North American continent. (See Fig. 311.)

Products; Cities. The wealth of British Columbia consists of minerals, forest products, and fisheries. The minerals include gold, silver, copper, and coal, and are being developed rapidly. The forests of the coast side of the mountains are largely made up of the great Douglas firs, the products of which are prepared for market along the coast and on Vancouver Island. Salmon abound in the streams and are canned in great quantities. Halibut, cod, and herring are found off the west coast.

The agricultural land of British Columbia is chiefly in the river valleys and the river deltas. A large part of the area has too heavy a rainfall for agriculture, so that this industry is of little importance.

Victoria, the capital, is situated on a good harbor, three miles from *Esquimalt*, the most important British naval station on the Pacific coast of North America. *Vancouver* has the best harbor, and is the terminus of several steamship lines connecting North America with Asia and Australia and also of the one transcontinental railroad of Canada.

FIG. 325. *A cattle ranch in Saskatchewan.*

ALBERTA AND SASKATCHEWAN

Surface; Industries; Development. The provinces of Alberta and Saskatchewan, except in the north where trees abound, are mainly flat, treeless, grassy plains. Agriculture is largely developed in southern Saskatchewan; wheat, barley, and oats are the chief crops. The rest of the area is mainly devoted to grazing, particularly to the raising of cattle, horses (see Fig. 326), and sheep. This is true of the southern continuation of the plain in the United States. (See Figs. 184, 323, 324, and 325.)

FIG. 324. *A sheep ranch in Saskatchewan.*

The Territories. The northern section of Canada is known as the *Northwest Territories*. This whole

area is thinly populated and large parts are little known. The only inhabitants are a few white fur traders, wandering Indians, and the Eskimos who live along the coast. With the discovery of gold in the river gravels of the tributaries of the Yukon River, in 1896, the Yukon Valley leaped suddenly into fame. *Dawson*, the principal Canadian settlement in this area, is the center of the gold industry. At first the only communication with the rest of the world was by means of the Yukon, which was open for navigation only about four months of the year. During the winter mails were carried over the mountains by sledges and men. Recently, however, a railroad has been built from Skagway in Alaska to the headwaters of the Yukon, so that provisions can be more easily shipped to the miners and the gold more readily brought to the coast.

FIG. 326. *A corral of horses in Alberta.*

NEWFOUNDLAND

Occupation of the People; Cities. The chief occupation of the people of Newfoundland is fishing in the neighboring waters. (See Fig. 327.) Lobster canning is important.

Iron and copper are found in the island and are mined. Coal, silver, and lead also exist.

The neighboring islands of *St. Pierre* and *Miquelon* belong to France and are also centers of the fishing industry.

FIG. 327. *A fishing village on the shore of Newfoundland.*

St. Johns, the capital of Newfoundland, is a small town situated on a good harbor and therefore is the most important trade center on the island. It exports fish and manufactures cod-liver oil.

GREENLAND

Surface. Greenland, the largest island in the world, belongs to Denmark. The interior is wholly covered by ice, above which no mountains show. The coast is everywhere bordered by mountains and abounds in magnificent fiords.

People. The only white people are found along the southwestern coast, where the low plain gives an opportunity for permanent settlement. Here are a few Danes in the small towns, but the larger portion of the population of Greenland is made up of Eskimos. The Eskimos depend upon hunting and fishing for their living, and travel great distances in the summer months to get their necessary food.

Towns and Trade. The only towns are *Godthaab* and *Upernivik;* the latter is the most northerly permanent settlement in the world. What little trade the island has is chiefly with Denmark, and includes the down gathered from the eider duck, furs, and fish products.

Questions and Exercises

(1) When Canada has such an indented coast why are there not more good harbors? (2) Is the port of Vancouver closed in winter? Of Quebec? Of Montreal? (3) Draw a map of the great highway of the St. Lawrence and indicate the chief canals which aid navigation. (4) Locate the chief Canadian and American cities on this waterway. (5) Why are the Mackenzie and the Yukon rivers of so comparatively little commercial importance?

(6) Which city has more sunny days in winter, Montreal or Victoria? Give the reason. (7) How is the winter life of the two cities different? (8) Is the commerce of the Great Lakes closed

in winter? (Consult Fig. 82 for your answer.) (9) What influence upon the climate of the surrounding country do the Great Lakes have? (10) Why can grapes ripen in southern Ontario and not in eastern Montana?

(11) From what ports do steamers carry the exports of Canada to the United Kingdom? (12) Trace the routes across the Atlantic. (13) Locate the chief harbors of each of the maritime provinces. (14) How does the fog affect the fishermen off these coasts? Steamer traffic across the ocean? (15) Tell of the importance of Halifax to the United Kingdom.

(16) Describe the location of the city of Quebec. (17) Why is Montreal better located as an ocean trade route terminus than Quebec? (18) Draw the ocean and land routes which terminate at Montreal. (19) On an outline map of the world show the trade route between China and England via the Canadian Pacific. (20) Find the approximate distance by this route between Liverpool or Southampton and Yokohama. (21) Why is Ottawa well located for a capital city?

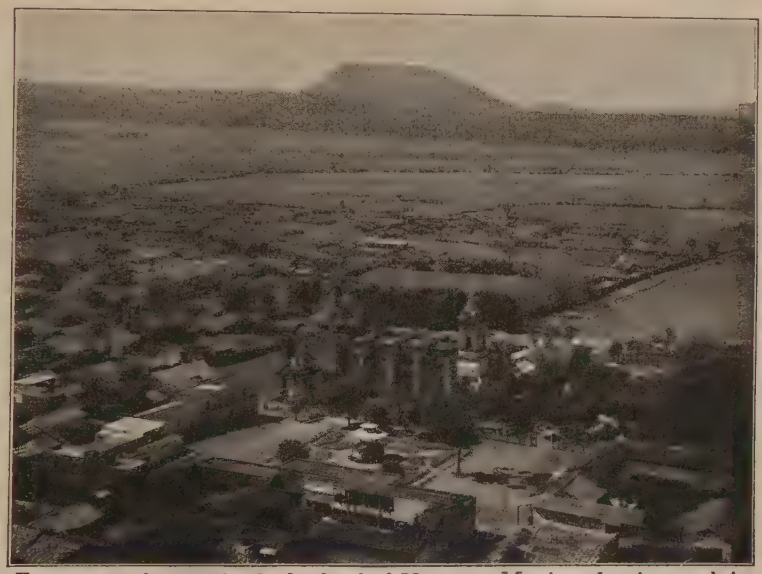

FIG. 328. *A town in the lowland of Yucatan, Mexico, showing a plain with a low range of hills in the distance.*

XXXIX. MEXICO

Size and Population. Mexico, the largest of the countries of southern North America, has a little more than one-fifth the area and about one-sixth the population of the United States. About one-half the people are Mexicans; the rest are whites and Indians.

Surface. Mexico is largely occupied by the southern extension of the Cordilleran Highland, which includes a broad, arid plateau in the north. High mountains surround the central plateaus, and rise from 6,000 to 8,000 feet above them. (See Figs. 173 and 334.)

Many of the highest mountains are nearly extinct volcanoes, which tower above the snow line in peaks of great beauty. *Orizaba*, *Popocatepetl*, and *Ixtaccihuatl* are the best known and most majestic peaks. Orizaba is one of the highest mountains of the continent. The *Nevado de Toluca* is especially famous for its beautiful crater lake, which is also noteworthy because it is one of the highest lakes in the world.

The only considerable lowland is the narrow eastern plain bordering the Gulf of Mexico and including Yucatan. (See Fig. 328.) This plain is nowhere more than a thousand feet in altitude.

Drainage. The only important river of Mexico is the *Rio Grande*, which forms the boundary between the United States and Mexico. This river is usually dry in its lower courses in the dry season, and therefore does not form an adequate boundary between the two countries. In fact much trouble has been caused in the past by the cattle men of Mexico and Texas, who have driven their herds from one country to the other in search of pasturage without paying any attention to the boundary line.

Owing to the fact that Mexico narrows southward, and that the mountains run nearly parallel to the coast, the other rivers are short. Cut deeply into the western mountain walls are many dry, young valleys, or *barrancas*, formed by the rushing torrents of the wet season. During the dry season

UNITED STATES
MEXICO
CENTRAL AMERICA
CUBA
CALIFORNIA
ARIZONA
NEW MEXICO
OKLAHOMA
TEXAS
Arkansas
Red
Mississippi
Louisiana
Santa Fe
Albuquerque
Guthrie
Little Rock
Dallas
Austin
Baton Rouge
Jackson
San Diego
Phoenix
Yuma
Tucson
Nogales
El Paso
Eagle Pass
San Antonio
Galveston
Corpus Christi
Brownsville
Laredo
Monterey
Saltillo
Chihuahua
Ciudad Juarez
Ciudad Porfirio Diaz
Carrizal
Presidio del Norte
Hermosillo
Guaymas
Santa Rosalia
Mulege
Comondu
Altar
Magdalena
Sonora
Sinaloa
Durango
Zacatecas
San Luis Potosi
Tampico
Soto la Marina
Victoria
Linares
Mier
Reynosa
Guerrero
Mutamoros
Nuevo Leon
Coahuila
Sierra Madre Oriental
Sierra Madre Occidental
Gulf of California
Pacific Ocean
Gulf of Mexico
La Paz
Santiago
San José
Mazatlan
El Rosario
C. San Lucas
Las Tres Marias
C. Corrientes
Revilla Gigedo Is.
I. Socorro
Tepic
San Blas
Guadalajara
Ciudad Guzman
Colima
Manzanillo
Leon
Guanajuato
Aguascalientes
Zacatecas
Jalapa
Vera Cruz
Alvarado
Tuxpan
Mexico
Puebla
Cuernavaca
Acapulco
Chilpancingo
Isthmus of Tehuantepec
Gulf of Tehuantepec
Puerto Angel
Salina Cruz
Tehuantepec
Tapachula
Ocos
Champerico
Guatemala
San Salvador
San Jose de Guatemala
Quezaltenango
Coban
Livingston
Campeachy
Campeachy
Merida
Progreso
Hunucma
Acanceh
Calkini
Hecelchakan
Tekax
Bolonchen
Lerma
Champoton
El Carmen
San Andres Tuxtla
Coatzacoalcos
San Juan Bautista
Tabasco
Flores
Peten
Yucatan
British Honduras
Belize
Bay of Campeachy
Gulf of Honduras
Tropic of Cancer
Havana
Matanzas
Cardenas
Bahia Honda
Pinar del Rio
Isla de Pinos
Nueva Gerona
Santa Fe
Cienfuegos
Trinidad
Sancti Spiritus
Ciego de Avila
Caibarien
Remedios
Santa Clara
Isabela de Sagua
Sagua la Grande
Cardenas
Matanzas
Jovellanos
Colon
Cuevitas
Batabano
Bahia de Cortes
Camagüey
Contramaestre
Jucaro
Nuevitas
Puerto Padre
Gibara
Holguin
Victoria de las Tunas
Sibanicu
Manzanillo
Bayamo
Guisa
Campechuela
Santa Cruz del Sur
Tunas de Zaza
Baracoa
Maisi
Guantanamo
Caimanera
Santiago de Cuba
Daiquiri
Cape San Antonio
Bahama Channel
Caribbean Sea
Comparative Area
Kansas
82,080 square miles
CUBA
Scale
0 25 50 150 150
133 Statute Miles to one inch
Latitude North
Longitude West 110° from Greenwich
Revised, 1910

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FIG. 330. *Mexican women grading coffee.*

the streams disappear, but their valleys, clothed in luxuriant tangles of dense vegetation, form wonderful bits of scenery, even for a country that abounds in scenic features.

The northern plateau has interior drainage and few streams. Scattered over this region, as far south as the City of Mexico, are many picturesque, shallow lakes, some of which are only two or three feet in depth and are much less extensive than they once were. In fact, when the City of Mexico was first occupied by white people it was an island city, but now the surrounding lake has retreated and the resulting swamp has been drained.

Climate and Rainfall. Mexico lies entirely in the Hot Belt and is blown over by the trade winds. The climate, however, is extremely varied, owing to the influence of the highlands, which run nearly at right angles to the general direction of the winds, and which rise so high that their peaks have a climate like that of the Cold Caps.

The hottest portion, known as the Hot Lands, extends from sea level up to about 3,000 feet, and is occupied by tropical vegetation. Between 3,000 and 7,000 feet the climate and vegetation are temperate, and this region is therefore known as the Temperate Lands. From 7,000 to 10,000 or 11,000 feet the climate is cool, like that of the northern portions of the North Temperate Belt; the higher peaks are clothed in perpetual snow.

The rainy season begins in May and lasts until October. During the height of the season heavy rains fall almost daily in the lower altitudes, and the vegetation bursts into bloom. In the dry season there is practically no rainfall, and everything dries up or ceases growing. The heaviest rainfall is on the eastern mountain slopes, where, in places, it is as much as one hundred and thirty inches. (See Fig. 97.) The interior plateau, being shut off from the influence of the trade winds, is deficient in moisture; in some places the annual rainfall is less than twenty inches.

Products of the Soil. Owing to the warm, moist climate and the great abundance of sunshine in the Hot and Temperate Lands, the

FIG. 331. *A market scene in Tampico, a Gulf port steadily growing in importance.*

products of Mexico are mostly agricultural. (See Fig. 184.) In the Hot Lands cotton, coffee (see Fig. 330), cacao, vanilla, and tropical fruits are raised in abundance, and on the plains of Yucatan the valuable fiber *heniquen*, used for making rope and sacking, is the chief crop. Mahogany, logwood, and other valuable tropical woods are found in the forests covering the lower slopes. In parts of this area the vegetation is so dense that travel is well-nigh impossible; hence the population in the forest region is very scattered.

In the Temperate Lands maize or Indian corn, beans, and tobacco are the principal crops. Cochineal insects also are raised. They live on a certain form of cactus and are

valuable as a red dye. In the plateau area are found the agaves, or maguey plants. (See Figs. 125 and 332.) They furnish valuable fibers, and their juices, when fermented, form *pulque* and *mescal*, the national alcoholic drinks.

Corn, wheat, and many other cereals common in the Temperate Belt abound in the cool zone and in the interior plateau. The leading cereal is maize and in its production Mexico is outranked only by the United States, Austria-Hungary, and Argentine Republic. (See Fig. 572.) The trees of the temperate and cool zones are evergreens, found particularly in higher latitudes. They cover the mountain slopes to a height of 13,000 feet, and form dense forests as high as 11,000 feet. It is in the cool region that we find the densest population.

FIG. 332. *A maguey plantation, a familiar scene on the plains of Mexico.*

In the drier northern regions of the plateau, agriculture is possible only by means of irrigation. Hence grazing is the chief industry. Sheep are raised in large numbers for their wool, which is of a very fine quality. Large parts of this area are unoccupied.

Mineral Products. The mineral wealth of the mountain areas of Mexico is enormous. Silver is the most valuable mineral product; in fact, Mexico produces about one-third of the silver of the world, and has vast areas as yet untouched. It is the second nation in the production of copper, and is rich in iron, coal, quicksilver, and other mineral products, though the latter have not been developed to any considerable extent. Sulphur is found in the volcanic areas, and jasper, Mexican onyx, and other gems and precious stones are found and exported in considerable quantities. (See Figs. 333 and 588.)

FIG. 333. *A Mexican mining village.*

Trade and Cities. Nearly seventy per cent of the exports of Mexico are precious metals, for most of the agricultural products are used at home. Cabinet woods, heniquen, vanilla, coffee, tobacco, cattle, and fruits are exported. The imports are mostly manufactured articles, such as iron and steel goods, cotton textiles, furniture, and other wood products. The larger part of the export trade is with the United States, and more than fifty per cent of the imports are secured from our country.

The best harbors of Mexico are found on the western coast. Few of these are important ports, however, because the products available for commerce are mostly raised in the eastern portion of the country. *Acapulco*, *Manzanillo*, and *Mazatlan* are the chief ports of the western coast. Acapulco, with its magnificent harbor, is a coaling station for vessels engaged in Pacific trade. The harbor of Mazatlan is shallow and unprotected. Its chief exports are metals and woods. Manzanillo is the leading western port for the exportation of cotton, sugar, and coffee.

The trade of Mexico is mostly centered on the eastern coast, because the harbors there have better connection with the agricultural regions. This section is well supplied with railroads connecting the ports with the interior. The most important commercial towns

are *Tampico* (see Fig. 331) and *Vera Cruz*. Vera Cruz is the chief port, owing to the fact that its harbor has recently been deepened so that ocean-going vessels can reach its wharves.

Besides the ports, the only important town is the ancient *City of Mexico*, the capital of the country. It is situated at an elevation of more than 7,000 feet, and is one of the most interesting old cities of America. It abounds in beautiful buildings built by the early Spaniards, in close association with which are found the modern buildings erected within recent years. The modern buildings are largely the result of the activity of people from the United States who have recently gone there to engage in manufacturing and agriculture. The cathedral of Mexico, built by the early Spaniards and still used as a place of worship by the Catholics, is one of the most famous and beautiful buildings of the Western Hemisphere. The City of Mexico is connected with the United States by two trunk lines of railroad.

FIG. 334. *The town of Pachuca, showing the rugged character of Mexico.*

Questions and Exercises

(1) What is the area of Mexico? (2) How many of the eastern states of the United States could be included in its area? (3) From a study of its surface, what reason can you give for its being so thinly inhabited?

(4) Which of the volcanic peaks mentioned in the text can be seen from the City of Mexico? (5) What does Rio Grande mean? (6) In what months is the lower course of this river usually dry? (7) What is meant by *interior drainage?* (8) Mention localities in the United States where interior basins are found.

(9) What is the January and July temperature of the City of Mexico? (10) Which has the more healthful climate, Mexico or Vera Cruz? (11) Describe how in passing from Vera Cruz to the upper slopes of Mount Popocatepetl you would pass through three zones of climate. (12) What contrast in vegetation would you see going on the railroad from Vera Cruz to Mexico? (13) On an outline map of Mexico, draw arrows showing the winds of the eastern and western coasts. (14) Color the map with shades of blue to show the regions of rainfall. (15) Locate a town in the region of heavy and light rainfall. (16) What influence has the northward movement of the Heat Equator upon the rains of Mexico?

(17) Where is the forest region and what are its products? (18) What tropical fruits are sent to the United States? From what port? (19) Find out if possible the amount of maize raised in a year by the United States and Mexico.

XL. CENTRAL AMERICA

Countries. The several small countries which make up Central America together occupy an area not quite one-half as large as the state of Texas. All these countries are independent republics except *British Honduras*, which is a colony of the United Kingdom, as are Canada and British Guiana.

Guatemala, the largest state of Central America, is a little larger than the state of New York; and *Salvador*, the smallest country in North America, is the size of Massachusetts. *Panama*, the most southern country of North America, belonged to Colombia, South America, until the latter part of 1903. It is now an independent republic, and is considered a part of Central America rather than of South America.

Surface and Climate. The whole of Central America, with the exception of a low, narrow plain on the eastern coast, is extremely mountainous. Owing to its position, the climate depends chiefly upon the influence of the trade winds. The eastern coast has a heavy

rainfall and is occupied by dense forests, in which the only inhabitants are Indians. The Pacific slope has a dry period from November to May. (See Fig. 97.)

Owing to the influence of elevation, Central America, like Mexico, may be divided into the Hot Lands, the Temperate Lands, and the Cool Lands. The best climate is found in the mountains at an elevation of over 6,000 feet.

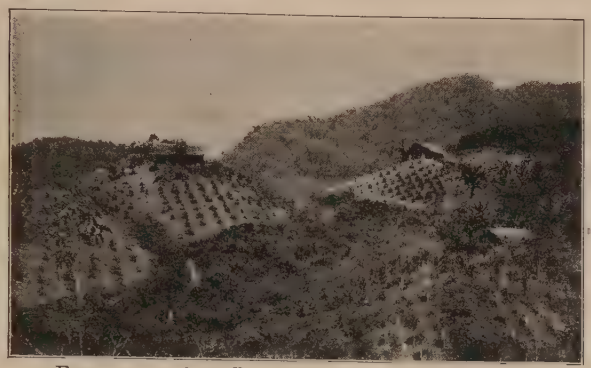

FIG. 335. *A coffee plantation in Guatemala.*

Products. Owing to the warm, moist climate and deep, rich soil, vegetation thrives everywhere in Central America, and agricultural products are the principal wealth of the country. On the Hot Lands below 3,000 feet, characteristic tropical plants like cacao, india-rubber trees, and the cocoanut palm abound. The Temperate Lands, lying between 3,000 and 6,000 feet, are largely devoted to coffee (see Fig. 580), especially in Guatemala and Salvador. In the Cool Lands potatoes, grain, maize, and beans are raised, as in the similar area of Mexico.

Grazing is the chief industry in the higher, drier regions of Honduras and Nicaragua, where cattle are raised. Sheep are found in Guatemala. The mineral products are very rich, but are little worked. Hence they are of slight importance, even in home trade.

Trade and Cities. Guatemala produces more coffee than any other country of Central America. (See Fig. 335.) The city of *Guatemala* by far the largest city of Central America, is the center of the coffee trade, and *Puerto Barrios*, the only port of any importance, exports most of the crop. Guatemala does most of its trading with the United States and Germany.

The ports of Honduras are small and unimportant. Fruits, some gold and silver, and timber products are sent to the United States.

The trade of British Honduras is mostly with the United Kingdom. The principal export is timber, brought down from the interior by the rivers. Bananas and cocoanuts are sent to the United States.

Salvador ranks next to Guatemala in the production of coffee. Coffee, indigo, tobacco, and silver are the leading exports. The commerce of Salvador is mostly with the United Kingdom and the United States, and is chiefly centered in *Libertad*, the port of *San Salvador*.

The principal products of Nicaragua are coffee from the west coast, hides from the plateau area, and forest products from the moist eastern coast. The chief port on the Caribbean Sea is *Blewfields*, but it is not easily accessible from the interior. Hence Blewfields is not so important in trade as *Corinto* on the west coast, which has a well-protected harbor and good railroad connections. Products sent to the United States generally pass through Corinto and then over the Isthmus of Panama.

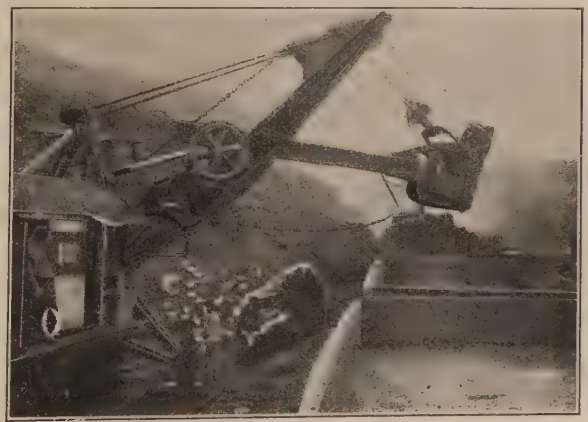

FIG. 336. *A steam shovel at work in Culebra Cut, Panama Canal. Notice the rock in the shovel.*

The dry western sides of the mountains of Costa Rica produce coffee of a superior quality. This coffee forms fifty per cent of the exports of the country; the larger portion goes to the United Kingdom. The other products of importance in trade are bananas, hides, rubber, and tortoise shell. Nearly all the commerce is centered in *Punta Arenas* on the western coast.

The products of Panama play a small part in the world's trade. Panama, however, is the most important country in Central America because of its position. The Isthmus of Panama has long been a barrier to trade, because all goods in transit between the Atlantic ports of North America or Europe and the Pacific ports of the Americas and Asia had to be transferred by rail between *Panama* and *Colon*, two ports on opposite sides of the isthmus. In a few years a ship canal, begun many years ago by the French, will be cut across the isthmus by the United States. (See Fig. 336.) Panama will then be situated on one of the world's great highways of trade, as Port Said and Suez have been since the completion of the Suez Canal.

FIG. 337. *Mont Pelée, Martinique, in eruption.*

Questions and Exercises

(1) What is the chief reason why these countries have not been occupied largely by white people? (2) What portions are best fitted for white races? (3) How does the climate of Central America determine its products? (4) Make a list of the chief products and opposite each write the name of the country producing it; in a third column write the name of the chief port of the country. (5) What products of Central America are found in Mexico also? (6) Mark with a cross the products which are sent to your home. (7) On a map of the world show how ocean trade routes will be shortened by the Isthmian Canal. (8) Why have Panama and Colon grown up?

XLI. THE WEST INDIES

Ownership. The West Indies include the great series of islands lying chiefly in the Gulf of Mexico and the Caribbean Sea. The larger islands to the west are known as the *Greater Antilles*, and the smaller islands to the east as the *Lesser Antilles*. *Cuba*, *Haiti*, and the *Dominican Republic* are independent countries. *Porto Rico* belongs to the United States, and the *Bahamas*, *Jamaica*, and several smaller islands belong to the United Kingdom. The remaining islands are possessions of France, the Netherlands, and Denmark.

Size and Surface. The islands of the West Indies vary in size from Cuba, about equal in area to Pennsylvania, to tiny coral islands rising only a few feet above the sea.

With the exception of the Bahamas, which include about 3,000 low coral reefs, nearly all the islands are mountainous. Many of them are volcanic, but until the eruption of Mont Pelée in 1902 it was supposed that the volcanic energy was weak. (See Fig. 337.) In 1907 an earthquake wrought great devastation in Jamaica.

Climate; Soil. The climate of the West Indies is tropical and, as in other tropical countries, the range of temperature is small. The changes of weather from day to day are few, except from July to October, when the islands are liable to be swept by severe tropical cyclones, which often do an immense amount of damage to crops and property. The rainy season comes toward the end of the summer, and causes a heavy daily rainfall. None of the islands has so well-defined a dry season as some parts of North America.

Owing to the prevailing moist climate and

to the deep, rich soil, all of the West Indies except the Bahamas, St. Thomas, and Antigua are extremely fertile. Vegetation grows in tropical luxuriance on the windward slopes.

People. The progressive people of the West Indies are mostly of Spanish descent, and Spanish is generally spoken throughout the islands except in the English colonies. The region was formerly occupied by native Indians, but they have now practically disappeared except in St. Vincent. Negroes are found in great numbers on all the islands, and furnish most of the labor for the plantations. They outnumber the whites except in Cuba.

CUBA

Surface and Coast Line. The island of Cuba includes about half the area of the West Indies and is the largest of the independent countries of that group. It is largely occupied by rugged mountains, particularly in the east and west, with a low-lying plain in the interior. The mountains are generally not more than 3,000 feet in height, although this height is exceeded in the province of Oriente. (See Fig. 338.) The coast everywhere is bordered by rugged cliffs, except in the central portion of the southern shore. The mountains are broken by many drowned valleys, forming land-locked harbors which furnish excellent shelter in times of storm. The most important harbor of Cuba is that of Havana on the north coast.

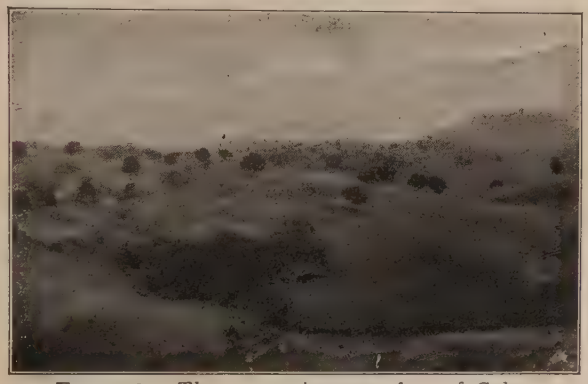

Fig. 338. *The mountainous surface of Cuba.*

Productions. The soil of Cuba is the best in the world for the raising of sugar cane, and sugar is therefore the most valuable product of the island. The large plantations on which the sugar cane is grown can be made to yield seven crops without replanting.

Tobacco is raised extensively on the slopes of the western mountains, and forms the second crop in importance. Havana tobacco, as all Cuban tobacco is called, is much prized for its quality and is in great demand in the United States. Coffee, bananas, oranges, and Indian corn are the other noteworthy crops. Iron and copper are found in rich abundance, especially about Santiago de Cuba.

Trade; Cities. Most of the productions of Cuba are sent to the chief exporting points by coasting vessels, although railroads are extensively developed in the western portion of the island. The chief imports are flour and manufactured goods from the United States, rice from Europe and from the other West Indian islands, and salt fish from British America. The larger portion of the trade is with the United States.

Havana, the harbor nearest to the United States, is the chief exporting center for tobacco, and handles about twenty per cent of the sugar. The trade of the other ports consists largely of products grown in the immediate vicinity.

HAITI AND THE DOMINICAN REPUBLIC

Trade; Cities. Haiti and the Dominican Republic are negro republics on the same island. The vast resources of the countries are not well developed. Coffee is the chief product of Haiti; cacao and logwood are also exported. *Port au Prince* has practically all the trade, which is mostly with France.

The trade of the Dominican Republic is chiefly with the United States, and includes sugar, tobacco, and cacao. *Puerto Plata*, on the northern coast, the chief port, is now closely rivaled by *Santo Domingo*, the capital.

JAMAICA

Products and Trade. The most important products of Jamaica are tropical fruits, sugar, rum (see Fig. 339), and coffee. The trade is centered mostly at *Port Antonio*, on the northern coast. Lines of fruit steamers, devoted chiefly to the banana trade, connect this port and *Kingston* with Boston and New York.

FIG. 339. *Hauling sugar and rum to market*
A characteristic scene in Jamaica.

BAHAMAS

Climate; Trade. The Bahama Islands are best known as a winter health resort on account of their mild climate. The trade is principally with the near-by United States, and includes oranges, pineapples, and other tropical fruits, and sponges.

LESSER ANTILLES

Products; Trade. The people of the Lesser Antilles depend largely upon the production of sugar (see Fig. 340) for their living, and import most of their food. Cacao, spices, lime juice, and fruits are also produced for export. The island of Trinidad is noted for its asphalt. The trade of Barbados is mostly with the United States, but that of the other islands is chiefly with the several countries to which they belong.

FIG. 340. *Harvesting sugar cane, Martinique, Lesser Antilles.*

BERMUDAS

Position; Trade. The Bermudas, a group of small islands about six hundred miles east of North Carolina, belong to the United Kingdom. They do not form a part of the West Indies, though they resemble the Bahamas in being formed by corals. Owing to the influence of the northward-moving waters of the warm Atlantic Drift, corals grow here farther north than in any other part of the world.

The trade of the Bermudas is mostly with the United States, and includes early onions, potatoes, Easter lilies in the spring, and lily bulbs during the rest of the year. *Hamilton*, the only port of importance, is the metropolis of the islands.

Questions and Exercises

(1) On a map of North America color the West Indies according to the various countries which own them, leaving uncolored those which are independent of a great power. (2) Tell what you can of the recent eruption of Mont Pelée at Martinique. (3) How does the presence of the ocean affect the climate of these islands? Compare their summer temperature with your own; their winter temperature. (4) From what plant besides the cane is sugar obtained? Does our country produce much of this sugar? How does the production of this sugar affect the sugar industry of Cuba? (5) On the map used in Exercise 1 locate the chief ports of the West Indies and draw trade routes to the United States. On the margin of the map write the imports from the United States; the exports to the United States. (6) Make a list of the products of these islands and opposite each write the islands where each is produced. (7) Why have the resources of these islands not been so well developed as those of the Mississippi Basin? (8) Make a list of the nations having possessions in North America, and opposite each write the names of these possessions.

SOUTH AMERICA

XLII. THE CONTINENT AS A WHOLE

Size and Position. South America is the fourth in size of all the continents. (See Fig. 28.) It is nearly twice as large as Europe, a little smaller than the whole Russian Empire, and contains abouth one-seventh of the land of the world.

South America was explored and developed by the Spanish and the Portuguese and today the larger proportion of the white inhabitants speak these languages. Throughout the continent are large areas that are but little known, and there are few cities of dense population.

The larger part of South America lies in the Hot Belt, and hence has a tropical climate and the chief products are tropical. The extreme southern tip of South America extends into the Cold Cap, and is the only land of any of the continents in the Southern Hemisphere having a cold climate. (See Fig. 74.)

FIG. 341. *The position of South America among the continents. North America is the only land mass near by.*

Coast Line. The coast line of South America is regular, except in the south and southwest, where it is bordered by islands and indented by many fiords. There are few bays or estuaries forming harbors; the principal ones are at *Bahia*, *Rio de Janeiro*, *Guayaquil*, and at the mouth of the La Plata. (See Fig. 346.)

Surface. A large portion of South America is a great lowland, not more than six hundred feet in altitude, and drained by the *Amazon*, the *Orinoco*, and the *La Plata*, with their tributaries. There are three highlands, two—the *Guiana Highlands* and the *Brazilian Highlands*—in the east, and the great western *Cordillera*, or *Andes Mountains*, which extend the full length of the western coast. (See Figs. 341 and 342.) Some of the peaks of the Andes exceed 20,000 feet in altitude, and are the highest mountains in the Western Hemisphere. Over six per cent of the continent has an altitude of more than 10,000 feet, a proportion of high land exceeded only in the continent of Asia.

The Cordillera. The Cordilleran Highland of South America is much narrower than the great highland of North America, and is unbroken by water gaps. There is only one railway line between the countries of the eastern and western coasts, and the passes which can be readily used in travel or trade are few.

In northern South America the Andes Mountains consist of an eastern and western range, separated by the valley of the Magdalena River. South of the equator the mountains increase in altitude and are bordered on the east by the great plateau of *Bolivia*. Some of the peaks in this region are volcanic; the best-known volcanic peaks are *Chimborazo* and *Cotopaxi*. (See Figs. 69 and 344.)

The Bolivian plateau contains a large area of interior drainage, in which lies the great

FIG. 342.

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lake *Titicaca*, at the altitude of 12,500 feet. (See Figs. 345 and 367.) The two principal mountains of this plateau are *Illampu* (*Sorata*) and *Illimani*. High peaks extend south into Chile and Argentine Republic, where *Aconcagua*, the highest mountain of the Western Hemisphere, is found. The southern Andes have been glaciated and partially drowned, forming the fiorded coast already mentioned.

In the extreme south the mountains slope off into the plateau of *Patagonia*. This plateau contains a considerable area of interior drainage. (See Fig. 343.)

The Brazilian Highlands. The Brazilian Highlands occupy a large portion of southeastern Brazil. The mountains rise to their greatest altitudes close to the coast, where some of the peaks reach a height of over 10,000 feet. The largest rivers rise on the highlands and flow down the long slopes toward the north and the west.

FIG. 343. *Along the rocky and precipitous coast of Patagonia.*

The Guiana Highlands. The Guiana Highlands occupy the larger part of Guiana and of Venezuela and Brazil south of the Orinoco. The highest peaks rise to over 8,500 feet.

Rivers. The large rivers of South America all lie in the great plains and flow into the

FIG. 344. *Cotopaxi, one of the most famous peaks of the Andes.*

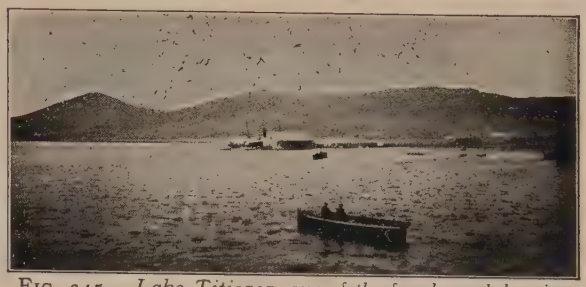

FIG. 345. *Lake Titicaca, one of the few large lakes in the world at a high elevation.*

Atlantic, as do nearly all the great rivers in the world. These rivers are important routes of commerce. The *Orinoco* is navigable for nearly a thousand miles, the *Amazon* for 2,600 miles; the basin of the Amazon contains 50,000 miles of navigable streams.

The *Paraná* and *Paraguay* rivers, which together with the *Uruguay* form the *La Plata*, are navigable into Brazil, but are interrupted in their head-waters by rapids and falls. (See Figs. 347 and 348.) The Paraná and Paraguay rivers are important for their commerce, however, because they lie in the most productive temperate region of the continent. The only large river on the western side of the Andes is the *Magdalena*, which drains a large part of the interior of Colombia and flows into the Caribbean Sea.

Climate. The whole of South America, from the north coast to the southern tropic, is swept by the trade winds during the year. In the southern summer, when the Heat Equator is south of the equator in Brazil, the winds blowing in toward this region on the northeast and southeast bring much moisture, which falls as heavy rain. (See Fig. 97.)

Heavy rainfall at this season occurs on both sides of the Brazilian Highlands. The southern slopes are watered by the southeast trade winds, while the northern slopes receive

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FIG. 346.

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much moisture from the trade winds that blow in from the northeast.

The northeast trade winds, moving up the Amazon Valley, produce a heavy rain throughout the valley, with the maximum on the east slope of the Andes, where the higher altitude causes increased precipitation. A heavy rainfall occurs on the Guiana Highlands also. All these regions have over eighty inches of rain a year, but the heaviest fall is found on the northwestern coast, where it reaches a maximum of more than one hundred and sixty inches.

FIG. 347. *The Parana River, Argentine Republic, showing a river steamer.*

The western coast from Guayaquil to Valparaiso, being in the lee of the mountains, receives a very slight rainfall, in some places below twenty inches and in others less than ten inches. South of Valparaiso the western coast is swept by the prevailing westerlies, and hence receives considerable rain, with the heaviest precipitation in the winter. The dry regions in these latitudes are found in the east in the lee of the Andes, and extend to the coast from Bahia Blanca to the Strait of Magellan.

FIG. 348. *Victoria Falls, Iguacu River, Brazil.*

Distribution of Vegetation. The distribution of vegetation here, as in other continents, follows closely the distribution of rainfall. The dry southeastern section is occupied by dwarf plants. North of this region, near the estuary of the La Plata, grassy steppes are found, with dry steppes farther west at the foot of the Andes where the moisture is less. The grassy steppe or *pampas* region has trees only along the streams. Farther north evergreens are found near the coast, and subtropical palms grow abundantly in the *Gran Chaco*.

Southern Brazil lies in the savanna area and is known as the *campos*. The area is occupied by tall grasses, while farther north cocoanut palms are found. The plateau lying west of the Brazilian Highlands, known as the *Matto Grosso*, or *Great Woods*, is really in the savanna area, but the increased altitude causes a heavier rainfall, so that forests abound.

The Amazon Valley is mostly a tropical jungle commonly called the *selvas*, and contains the densest vegetation on the globe. Palms, figs, and bamboos are the characteristic trees, around which enormous creepers twine, and from the branches of which beautiful orchids hang. North and west of the Orinoco, and in the plains of Colombia, is another great savanna area with tall grasses and isolated trees, and known as the *llanos*.

On the west coast tropical forests abound in the north, while the desert of *Atacama*, in the lee of the Andes in the trade-wind area, is practically without vegetation. In the

extreme south dense forests of evergreen trees occupy the western slopes. This forest region grades into a desert region on the north, and on the south into the dwarf trees and bushes characteristic of cold areas.

On the high mountains there is a great range of temperature and moisture, and hence of vegetation. In Ecuador and Peru one can find, by going up 12,000 feet, all the forms of vegetation common in the tropical, temperate, and polar regions.

FIG. 349. *Cattle grazing on the level slopes of the Argentine Republic.*

Animals. South America is a separate animal region. It has already been described. (See page 75.) Among the valuable animals are the *alpaca*, the *llama*, and the *vicuña*. The llama is used as a beast of burden, and the vicuña and alpaca furnish valuable fibers. Horses abound in the pampas and llanos, and cattle are raised in great numbers in the wetter, and sheep in the drier and cooler southern grasslands. (See Fig. 349.)

People. South America has the smallest population of any continent except Australia. The natives are mostly Indians; some of them are very primitive, using practically no tools or implements. In the basin of the Amazon some of the tribes are even cannibals.

Europeans are found in those sections of the country where the climate favors agriculture and grazing. Portuguese are particularly numerous in Brazil, and Portuguese is there the national language. Elsewhere, Spanish is generally spoken. The Spaniards are the most progressive people, and occupy nearly all the other countries of the continent except the Guianas.

Courtesy of Field Museum

FIG. 350. *The great four-toed ant-eater, gray with a striking black breast band, inhabits South American forests.*

Questions and Exercises

(1) When it is noon at Pittsburg what time is it at Guayaquil? (2) When it is noon at Rio de Janeiro what time is it at your home? (3) How does the width of the continental shelf on the east coast of South America compare with that of the continental shelf on the east coast of North America? (4) What islands off North America are similar in position to the Falkland Islands? Galápagos Islands? (5) Compare the highlands of North and South America; the lowlands. (6) How near the Pacific Ocean does the Amazon River rise? (7) How do the Brazilian and Appalachian highlands differ? (8) How do the western Cordilleran Highlands in the two continents resemble each other? (9) In what ways are the western coasts of the two continents alike?

(10) Compare the rainfall of Bahia and the Matta Grosso, and account for the difference. (11) Why should Valparaiso have less rain than Córdoba or Rosario? (12) Give the reason for the desert coast north and south of the Tropic of Capricorn. (13) Compare the rainfall of the western coasts of North and South America, noting similarities and differences. Give causes. (14) What region in South America has features like the Mississippi Basin? (15) Why is the winter temperature of Norfolk, Virginia, so much lower than that of Buenos Aires? (16) What is the annual range of temperature of Lima? Para? Buenos Aires? (17) What difference do you make in your mode of life in summer and winter that the people of Para would not make?

(18) What region in the United States has vegetation similar to that of the pampas? What is the chief occupation of each region? (19) Draw a picture to represent Cotopaxi, and show the different vegetation zones from its base to its summit. (20) Write a list of the different vegetation regions of South America, and opposite the name of each region put the chief plants and animals that are found there.

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FIG. 351.

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FIG. 352. *Diamond mining in Brazil.*

XLIII. BRAZIL

Size and Industries. *Brazil* is a little larger than the United States, not including the dependencies and Alaska. It lies in tropical and subtropical South America, and is largely occupied by forests and grazing land. There is little cultivated land. The principal agricultural districts are along the southeastern coast and in the highland section just north of Rio de Janeiro. In the drier southern regions there are important colonies of Germans and Italians, who devote most of their attention to grazing, although some manufacturing of woolen goods is carried on.

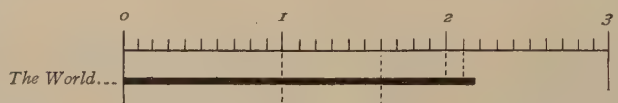

FIG. 353. *The world's production of coffee, in 1902, in billions of pounds.*

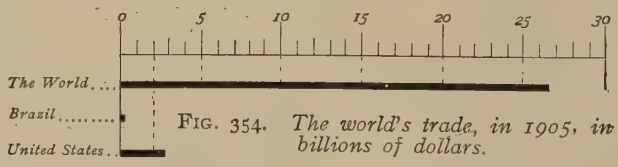

FIG. 354. *The world's trade, in 1905, in billions of dollars.*

Products. The highland region north of Rio de Janeiro produces three-fourths of the coffee of the world. (See Figs. 353 and 580.) Other important and valuable agricultural products are sugar, cotton, manioc, the chief food of the people, and tobacco. (See Fig. 351.)

But the great wealth of Brazil lies in its forests and minerals. Rubber is the most important product of the Amazon region, and cacao is also produced abundantly. Other products are Brazil-nuts and valuable woods.

The more important minerals are gold, diamonds, and iron. Iron is little mined on account of the absence of the coal necessary for smelting, and diamonds are not so important as they once were on account of the much greater and better deposits at Kimberley in South Africa. (See Fig. 352.)

Trade. Brazil has nearly one-third of the commerce of South America, most of which is with the United States (see Fig. 354), Germany, the United Kingdom, and France. The chief exports are coffee and rubber, though hides and cotton are exported also. Brazil is the chief center of supply for coffee sent to the United States. The imports are food stuffs, coal, cottons, and machinery, for the most part from the United Kingdom and Germany, and wheat and flour from the United States.

Interior trade is largely carried on by boats on the extensive rivers of Brazil. There are few railroads except in the coffee region. Oceanic trade is largely centered at a few ports. *Rio de Janeiro*, the capital, has a fine harbor and is the chief port. (See Fig. 355.) *Santos* being nearer to the coffee-growing region leads in the export of coffee. *Bahia* and *Pernambuco* trade in sugar, coffee, and tobacco.

FIG. 355. *Rio de Janeiro, the capital of Brazil.*

Questions and Exercises

(1) Describe the forests of the Amazon. (2) Why is the Amazon of less importance commercially than the St. Lawrence? (3)

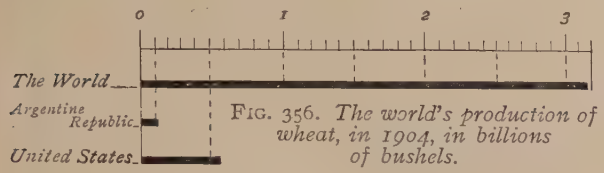

FIG. 356. *The world's production of wheat, in 1904, in billions of bushels.*

Account for the scanty population of the Amazon Valley. (4) Why are Germans and Italians desirable immigrants here? (5) Make a list of the chief uses to which rubber is put. (6) Consult the temperature maps in this book and find out the summer and winter temperature of the coffee regions.

(7) On an outline map of South America locate the chief towns of Brazil and write their imports. (8) Draw routes between each port and the foreign countries with which it trades. (9) Find out what food stuffs are imported to these towns. (10) What city in the United States is about the size of Rio de Janeiro?

FIG. 357. *Drying hides near Buenos Aires, Argentine Republic.*

XLIV. ARGENTINE REPUBLIC

Size and Surface. The *Argentine Republic* extends from north of the southern tropic to the extremity of the continent, and includes

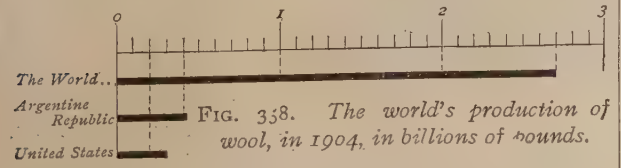

FIG. 358. *The world's production of wool, in 1904, in billions of pounds.*

part of the island of *Tierra del Fuego*. The area is about a third that of the United States, and is mostly a great plain, broken only by occasional low hills. The southern portion is practically uninhabited, and the *Gran Chaco* is occupied by wild Indian tribes. The Argentine Republic is the largest country in the temperate portion of South America, and has, therefore, a better opportunity for future development than any other portion of the continent.

Industry. The abundance of grass on the pampas makes the Argentine Republic a great grazing country, although agriculture is being developed along the lower Paraná by settlers from southern Europe. Wheat, flax, and maize are the chief agricultural products; the acreage devoted to wheat is increasing rapidly, and this product is now exported. (See Fig. 356.) There are more than 25,000,000 cattle and more than 75,000,000 sheep in the grazing country, most of them near Buenos Aires.

Trade; Cities. The wool produced is very fine and much desired by the manufacturing people of the world. It is natural, therefore, that the Argentine Republic should be, next to Australia, the chief wool-producing and exporting country in the world. (See Fig. 358.)

Frozen mutton is sent to Europe, particularly to the United Kingdom, and live beef to the other nations of western Europe.

Sun-dried or jerked beef is sold to the more tropical countries of South America. These products, with hides (see Fig. 357), form more than half the exports, which also include gold, silver, and copper. Iron, steel, and textiles are the chief imports. The Argentine Republic has almost one-half of the trade of the continent, a large part of which is with the United Kingdom, France, and Germany.

FIG. 359. *In the valley just outside of Córdoba.*

Interior trade is greatly aided by the fine system of navigable rivers and by railways, better developed here than in any other country of South America. A railroad joining *Buenos Aires* with *Santiago* and *Valparaiso*, Chile, thereby connecting the east and west coasts, is now practically completed. This railroad crosses the *Uspallata Pass*, at an altitude of 12,300 feet, by means of a tunnel.

Buenos Aires, the capital, is the chief port and the largest city of the Southern Hemisphere. (See Fig. 359.) Its harbor is not satisfactory because it has to be continually cleared out on account of the silting of the river. *Rosario*, in the center of the agricultural region, in time will be an important port, as the river is being deepened so that the city may be reached readily by ocean-going vessels.

FIG. 360. *Grazing on the grassy plains of Uruguay.*

Questions and Exercises

(1) What are the chief reasons why the Argentine Republic is the most progressive country in South America? (2) Tell how the beef from the pampas reaches Sweden; Hamburg. (3) What effect on the trade of La Plata will the new Andean Railroad have? (4) Compare the distance Argentine wheat travels in going to Germany with that of wheat from Dakota and Manitoba. (5) Name some of the industries of Buenos Aires that result from its surroundings. (6) What advantages in location has Mendoza?

XLV. URUGUAY AND PARAGUAY

URUGUAY

Climate and Industry. The surface and climate of *Uruguay* are similar to those of the Argentine Republic. Grazing (see Fig. 360) is therefore the principal occupation, though agriculture is increasing. Wheat, grapes, olives, and tobacco are raised to some extent.

Trade. The cattle products of Uruguay are exported chiefly in the form of jerked beef and beef extract. Wool is sent to Europe and the United States, and some wheat is exported to Brazil. (See Fig. 361.) A large part of the trade is with the United Kingdom.

Montevideo is the capital and chief city. (See Fig. 362.)

PARAGUAY

Surface and Industry. *Paraguay* is a rich but undeveloped country largely occupied by Indians. The surface is made up of plains and low mountains covered by forests. The plains are chiefly devoted to the production of Paraguay tea, or *mate*, and oranges.

Trade. Paraguay tea is cheaper than Asiatic tea and its use in South America is constantly increasing. Lumber is the principal

forest product, and is sent to the Argentine Republic and Uruguay, both of which lack timber. These products, together with hides and tobacco, are the chief exports. The principal imports are cotton goods, wine, and rice.

Asuncion, the capital, from its position on the Paraguay River, is the most flourishing town and commercial port.

FIG. 361. *Transportation in Uruguay. To convey the products to the ports, often six to ten pair of oxen are used to draw the heavily loaded wagons across the country.*

Questions and Exercises

(1) What is the chief article of trade between Paraguay and the neighboring countries? (2) What does Paraguay import from the Argentine Republic? In what parts of both countries does wheat grow; grapes; forests? (3) Give the chief advantages of the location of Asuncion. (4) Why should the Argentine Republic export wheat to Brazil rather than to the United States?

XLVI. CHILE

Chile is a long, narrow country, about as large as California, Oregon, and Washington. It includes many islands and all the land on both sides of the Strait of Magellan. Northern Chile is a desert, and agriculture there is possible only where irrigation is practiced.

Products. The main products of northern Chile are nitrate of soda and guano. The agricultural portion of Chile lies in the coastal area between *Santiago* and *Valdivia*. This portion is the most densely populated; wheat, cattle, and fruits are the chief products. Both temperate and tropical fruits are raised. South of Valdivia the country is forested, and lumbering and fishing are the chief occupations.

FIG. 362. *Montevideo, showing the quays and the broad harbor.*

Trade; Cities. Nitrate of soda, copper, iodine, and wheat are the leading exports of Chile. Nitrate is far greater than all other exports combined. Wheat is exported to tropical South America to some extent, especially to Peru and Ecuador. Sugar, beer, wagons, and machinery are manufactured to a limited extent, but most of the products are consumed at home. Textiles are the chief imports. The trade is chiefly with the United Kingdom and Germany.

Good roads and railroads are few, and the high mountain wall of the Andes prevents goods from the interior of this portion of South America being exported by way of the western ports. Some trade, however, is carried on with the Argentine Republic over the Andes. Cattle are imported into the country along this route.

Valparaiso, the port of *Santiago*, the capital, is the chief city for imports, and is the most important town on the Pacific coast of South America. *Iquique*, near the nitrate fields, is the chief exporting center. *Punta Arenas*, on the Strait of Magellan, is a calling station for steamers, but sailing vessels usually go around Cape Horn on account of the strong tides and currents of the Strait of Magellan.

Questions and Exercises

(1) Through how many degrees of latitude does Chile extend? (2) What change in temperature is felt in going from Valparaiso across the mountains? (3) What is the rainfall of the northern part? Of the southern part?

FIG. 363. *Nitrate works in Chile.*

(4) What are the products of the desert region? Of the middle and southern regions? (5) What are the chief articles of trade between Chile and other South American countries? (6) Why is Chile so progressive a country? (7) What language is chiefly spoken in Valparaiso?

XLVII. FALKLAND ISLANDS

Climate and Occupations. The *Falkland Islands* are two small, wind-swept islands lying to the east of the Strait of Magellan. They belong to the United Kingdom and have a great strategic value for that country, because they are a way station on the great western sea route to Australia and India. Owing to their position in the "roaring forties," the climate is damp, though the rainfall is not heavy. There is but little sunshine.

Owing to the lack of sunshine and warmth, practically no trees grow here, but the extensive swamps produce much peat. Sheep are raised in considerable numbers, and some frozen mutton is exported. With the exception of beef and mutton, nearly all the food stuffs have to be imported.

Questions and Exercises

(1) Why are these islands so wind-swept? Tell of the drawbacks there would be to living in these islands. (2) What food stuffs are brought from England? (3) What flowers would grow there? (4) How will these islands be affected by the Panama Canal?

XLVIII. ECUADOR, PERU, AND BOLIVIA

Surface. *Ecuador*, *Peru*, and *Bolivia* are extremely mountainous countries. Peru and Ecuador have a narrow lowland on the west and broad tablelands and plains on the east, draining into the Atlantic. Bolivia has mountains on the west and the broadest plateau of the Andes in the east. With the exception of Paraguay, it is the only country in South America which has no coast.

Products and People. The coastal lowland of Peru is dry in the south and has extensive deposits of nitrate of soda, while farther north in Ecuador, owing to the increased rainfall, the land may be tilled. The mountains are high, with few passes, but their slopes are cultivated in places.

The eastern regions of Peru and Ecuador are densely forested. The mountains contain rich deposits of silver, formerly much more important than they are now. The Spaniards, by the early subjugation of the native Incas, secured control of the valuable silver mines of this region. The inhabitants are very largely Indians, but they are intelligent, and far superior to the other Indians of South America.

Trade. Cacao, grown on the lowlands of Ecuador, is the chief export of that country, and is sent to France and Spain, to San

FIG. 364. *Native carrier. A street scene in Quito, Ecuador.*

Francisco, and to New York. Panama hats are perhaps the best-known product of this region. They are so named because they have to be carried across the Isthmus of Panama. *Guayaquil* has the best harbor on the Pacific coast. *Quito*, practically on the equator, is the capital of Ecuador and is a very ancient city. (See Fig. 364.) Owing to its altitude, it has a delightful climate.

Sugar and metallic ores, cotton, wool, and rice are the chief exports of Peru, though cinchona and rubber are exported in large quantities from the Andes down the eastern rivers. The imports are textiles and machinery.

Interior trade is carried on with difficulty because of bad roads and the lack of railways. A railroad has been built from Lima over the mountains to the silver mines, crossing the Andes at a height of 15,600 feet. Callao, is the port of the capital, Lima, and is the chief city of Peru.

FIG. 365. *A sugar plantation in a valley near Bogotá.*

Bolivia is dependent for its trade upon the neighboring countries. Silver, tin, copper, and rubber are sent down the eastern rivers. Some commerce is carried on with the ports of Peru and Chile. La Paz, with a population as large as that of Des Moines, Iowa, is by far the largest city. Clothing, textiles, and hardware are imported.

Questions and Exercises

(1) What advantage would it be to these countries if the Andes were no higher than the Rockies? (2) Show how the Panama Canal will benefit their trade. (3) Draw a diagram cross section to show the difference in vegetation between the east and west slopes of Peru. (4) Down what eastern rivers are the products from Bolivian mines sent? (5) Find out for whom Bolivia was named? (6) What can you find out about the ancient Inca Indians of Peru? (7) How long are the days at Quito? (8) In what direction would a shadow point in Quito at noon to-day?

XLIX. COLOMBIA, VENEZUELA, AND GUIANA

Development and Climate. *Colombia*, *Venezuela*, and *Guiana* are undeveloped countries, though all are rich in minerals and agricultural lands. Guiana is composed of three colonies held by the United Kingdom, the Netherlands, and France. With the exception of Canada and British Honduras they are the only colonies in the mainland of the Americas belonging to European nations. The climate of all three countries is everywhere hot and moist except in the mountain districts. The lowlands are malarial, while the highlands are healthful. The most dense population is found in the highlands of Colombia.

Products. Cattle are raised in the plains and coffee is grown on the hill slopes. Rice is produced in the lowlands, mostly for home consumption. The crops of temperate latitudes are found in the high plains among the mountains. Sugar is raised in abundance in

FIG. 366. *The city of Cartagena, one of the two large coast ports of Colombia.*

the lowlands of Guiana, and is the only product of importance, although it is now giving way to cacao and coffee because the people have found it best not to depend upon one crop only. Rubber, cinchona, tobacco, and sugar (see Fig. 365) are produced in Colombia, and cacao is of importance in Venezuela.

Gold and silver are found in all the countries, but the mining industries are best developed in Venezuela and Colombia.

Trade; Cities. Few of the towns of Guiana are important in trade. *Georgetown* leads in commerce, which is carried on mostly with the United Kingdom and the United States. Sugar is the chief export, and manufactured goods and food products are the principal imports. The chief inland towns of Venezuela are *Carácas*, the capital, and *Valencia*.

La Guaira, the port for *Carácas*, the capital, is a cacao and coffee exporting city. Venezuela has practically no railways and few roads. Hence its interior trade is carried on with difficulty, except in the valley of the Orinoco, which is navigable to the foot of the Andes.

In Colombia the Magdalena River is the highway of trade, and *Barranquilla*, at the mouth of this river, is the chief port and town. *Cartagena* once held this position, but its commerce has declined on account of the silting of its harbor. (See Fig. 366.) *Bogotá*, the capital, is considered the most beautiful city of South America, and is well situated in a rich agricultural country.

Questions and Exercises

(1) Why should the highlands of these countries have a denser population than the lowlands? (2) Upon what products of South America do we depend? (3) What are the most progressive nations of South America? (4) Locate the chief agricultural regions; mineral regions; grazing regions. (5) Write from memory the names of the countries of South America and the chief cities in each.

SUMMARY

South America is, on the whole, unprogressive, except in the countries of the temperate belt and in Brazil. The governments are unstable, revolutions are frequent, and business cannot therefore be carried on successfully. The continent is deficient in railroads and highways, and hence the native riches are not developed. The exports are mostly mineral and cattle products, except in the few scattered agricultural regions. The imports are chiefly food stuffs and manufactured goods, especially textiles and steel. It is anticipated that when the Panama Canal is completed, so that commerce can be readily carried on between the western coast and the large commercial centers of the United States, the continent will develop rapidly.

FIG. 367. *Straw boats used by the natives on Lake Titicaca.*

EUROPE

L. THE CONTINENT AS A WHOLE

Europe and Eurasia. The so-called continent of *Europe* is really a peninsula of the continent of *Eurasia*, but it has so long been considered as a separate continent that we shall treat it as such. We can study the political geography of Europe without thinking much of the greater land mass to the east but when we consider its climate we shall need frequently to refer to the relation of Europe to Asia.

FIG. 368. *The position of Europe among the continents.*

Size and Position. Europe is the smallest continent except Australia. Its area is only about half that of North America and not much larger than the area of the United States. (See Fig. 28.) It is, however, one of the most important continents because it contains a large number of the leading nations of the world. It extends in latitude over 34 degrees and in longitude over 70 degrees. (See Fig. 369.)

Europe is just across the Atlantic Ocean from the great nations of America (see Fig. 368), and is separated from the continent of Africa by a strait, which at the narrowest point is only eight miles wide. It lies almost in the center of the great land hemisphere, and, partly because of its favorable position, it has long been the leading continent of the world commercially.

Coast Line. Europe has the longest coast line in proportion to its area of any of the continents. This fact is of great importance, because it has allowed many nations to develop within a small territory, and to have ready access to the ocean. Several of the great peninsulas, especially those along the northwestern and the southern coasts, also have extremely irregular shore lines, and for this reason abound in excellent harbors. (See Fig. 369.)

The people living along such a shore naturally became expert seamen and gained the confidence which enabled them to explore the great ocean to the west when they began to look for a new route to the riches of India and the East Indies. It was while endeavoring to find such a route by sailing to the west, that Columbus discovered America.

The Atlantic coast of Europe, from the Bay of Biscay northward, is bordered by a broad, shallow continental shelf, which surrounds the United Kingdom and extends beyond Iceland. It is over the shallows of this continental shelf that the best and most available fishing grounds are found. (See Fig. 376.)

Surface. Europe, like North and South America, consists of two extensive highland areas with a great lowland area lying between them. In northwestern Europe, extending in a broken line from Scandinavia to Ireland, is the lesser highland. It may be compared with the Appalachian Highland in our own continent, and the Brazilian Highlands in South America. The greater highland area

FIG. 369.

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of Europe begins in the mountains of Spain and continues through the Alps, the Balkans, and the Carpathians to the Black Sea. Branches of this highland extend southward along the axes of the several southern peninsulas. It is interesting to compare this area with the Cordilleran Highland of North America and the Andes Mountains of South America. In the Western Hemisphere each main highland extends north and south; in Europe the main divide runs east and west. Between the great highland areas of all three continents is a great lowland. Each of these regions of Europe needs to be studied in detail so that we may know the way in which its features affect the lives of the people living in each area.

The Great Lowland Plain. The larger part of Europe is a great lowland plain, extending from the Atlantic Ocean on the west to the plains of Asia on the east. (See Fig. 369.) Eastern Europe lies almost entirely in this lowland, and its surface is in general rolling, with only a few inconspicuous heights like the *Valdai Plateau*. The northern part of the great lowland has been glaciated and hence contains many lakes, as in Finland, Scandinavia, and the Valdai Plateau. (See Fig. 371.)

The eastern part of this lowland contains many swamps. Across it stretches the natural divide between the long rivers of Europe, the *Volga*, the *Don*, and the *Dnieper*, which flow south, and the shorter rivers, the *Pechora*, the *Northern Dvina*, and the *Düna*, which flow north and west.

It will be noticed that all the long rivers flow into land-locked seas like the Black Sea and the Caspian Sea, and all the short rivers toward the Atlantic or the Arctic. (See Fig. 369.) This is an important point in considering the comparative value of the trade routes controlled by the different nations.

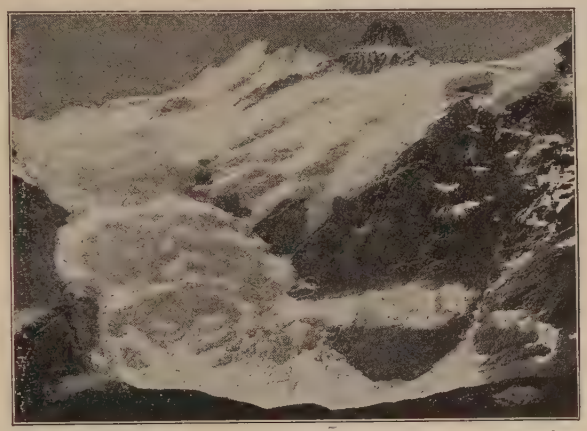

FIG. 370. *The snow-clad peaks of the Alps Notice the glacier and the mountain house on the left.*

The Highlands of Scandinavia and the United Kingdom. The *Scandinavian Highlands* rise to an altitude of 8,400 feet, and extend in an unbroken range throughout the Scandinavian Peninsula. These highlands have been glaciated and therefore abound in lakes, while the lower lands are covered with rolling moraines, so that the whole region has a rough, uneven, hilly surface.

The narrow western valleys have been glaciated and then drowned so that the western coast of the Scandinavian Peninsula is one of the most famous fiord regions of the world. The shore line is bordered by many islands, which break the force of the strong waves so that coastwise commerce is possible at all seasons of the year.

The Scandinavian Highlands extend south and west into the United Kingdom, forming the highlands of Scotland, Wales, and northern England. Highlands also skirt the rim of Ireland and nearly surround its central plain. All the highland region of the United Kingdom has been glaciated and lakes abound, many of which are famous for their beauty.

The arrangement of highlands and lowlands in Europe forms a striking contrast to the arrangement of surface features in North America. In Europe the greatest highland runs east and west; in North America, nearly north and south. A corresponding difference in certain features of the climate results.

The Alps. The highest portion of the great highland of southern Europe, which begins at

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FIG. 371. *A map showing the glaciated areas of Europe.*

the Atlantic Ocean and extends eastward to the Black Sea, is the *Alps*. These extend in a semi-circle from southeastern France to the head of the Adriatic, where they merge into the northwestern end of the mountains of the Balkan Peninsula and Greece.

The Alps contain many large glacial lakes, from which flow the *Rhine*, the *Rhone*, the *Aar* and the *Ticino*, of which Lago Maggiore properly is only an expansion. Each of these rivers gives an opening into the heart of the mountainous country, and is of great importance from the standpoint of travel and trade.

The Alps are so high and so cold, and lie in so moist a region, that they contain many famous glaciers (see Fig. 370) which are more visited than any others in the world. Ice and perpetual snow cover about 1,400 square miles of their surface, which is an area larger than the state of Rhode Island. The eastern Alps contain ridges of limestone rock which have weathered into pinnacles and points, giving a striking beauty to the landscape. This region is far-famed for its scenery.

Mountains of the Iberian Peninsula and Italy. Southwest of the great highland region is the *Iberian Peninsula*, another distinctly highland area, composed in large part of a plateau broken by many short, nearly parallel mountain ranges known as *sierras*. The highest of these ranges are the *Cantabrian Mountains*, extending on the north to the *Pyrenees*. The Pyrenees form an important natural barrier between Spain and France. (See Figs. 372 and 374.) The only lowlands in this area are found in narrow belts along the eastern coast and along the lower courses of the rivers which flow out from the plateau to the Atlantic Ocean.

South of the Alps lies the *Peninsula of Italy*, which is largely made up of the *Apennines* and the volcanic heights along the western coast. (See Fig. 373.) The mountains are so close to the sea that the rivers of Italy are all short, except the *Po*, which drains the great plain between the Apennines and the Alps. Italy also contains the well-known volcano, *Mount Vesuvius*, and south on the island of Sicily is *Mount Etna*, almost equally famous.

Highlands of France. The *Central Plateau* of France, which may be considered a part of the great highland of Europe, consists of a series of old, worn-down mountains, above which rise many cones of extinct volcanoes. This region forms the divide from which radiate the *Seine*, the *Loire*, and the *Garonne* rivers. The Central Plateau is bordered on the east by the *Cevennes*, which face the valley of the Rhone in a steep and continuous cliff. To the northeast are the *Vosges* mountains and the highland of the *Ardennes*, separated from the highlands of Germany by a valley similar to that of the Rhone. In this valley the *Rhine* runs for a part of its course.

The Carpathian, Balkan, and Ural Mountains. The eastern portion of the great highland of Europe is made up of the *Carpathian Mountains* which bound the plain of Hungary on the north and east. These mountains are separated from the highlands of the Balkan Peninsula by the narrow pass of the Danube known as the *Iron Gate*.

The Balkan Peninsula is a mountainous country throughout. The northern portion,

FIG. 372. *The highest peaks of the Pyrenees, showing flocks grazing on the lower slopes.*

which extends east to the Black Sea, is mostly occupied by the *Balkan Mountains*. Highland ridges also extend south through Turkey and Greece. It is the nearly drowned peaks of the southeastern ends of these highland ridges that form the many islands of the great archipelago of the *Ægean Sea*. (See Fig. 369.)

Bounding Europe in part on the east is the ridge of the *Ural Mountains*. These are more a rise of land than a mountain range, and form

FIG. 373. *In the mountainous district near the western coast of Italy.*

distinct features in the landscape only in the northern and southern parts of their course.

Climate and Vegetation of Europe. The whole of Europe north of the Alps and the Carpathians is in the track of the westerly winds throughout the year. (See Figs. 82 and 84.) Northwestern Europe lies directly in the path of these winds blowing from the Atlantic. It has for this reason a more even climate than eastern Europe, which lies nearer the interior of the great land mass of Eurasia and is subjected to the great seasonal range of temperature characteristic of regions situated at a great distance from the ocean.

Europe is fortunate in that its greatest highland extends east and west. If it ran north and south along the western coast, as do the highlands in North America, all central and eastern Europe would be a dry steppe like the great plains east of the Rocky Mountains in the United States. With the highlands running east and west, the moisture-laden winds from the Atlantic Ocean are free to sweep eastward and carry a moderate amount of rain to the central and eastern portions of the continent.

Revised, 1910

FIG. 374

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Southern Europe is swept by westerly winds in winter, when the wind system of the world has moved far south. In summer it lies in the northern trade-wind belt when the wind system is farthest north. (See Fig. 84.)

In each of these three divisions of Europe —the northwestern, the eastern, and the southern—the arrangement of highlands has an important influence upon the climate, and the climate, of course, affects the distribution of vegetation and industries. For this reason we need to study the climatic conditions of the three great divisions in some detail, in order that we may understand the distribution of vegetation and of those industries which depend upon the products of the soil.

Northwestern Europe. Owing to the proximity of the ocean and to the fact that the continent is cooler than the ocean in winter and warmer than the ocean in summer, the annual range of temperature along the northwestern coast of Europe is very slight. The cold winter winds come from the northeast, but they blow for a short time only, and are not so severe as the winds that reach the eastern coasts of North America from the interior of that continent.

FIG. 375. *A Laplander with his reindeer.*

The greatest rainfall is in the west, especially on the western side of the mountains of Norway and the United Kingdom. (See Fig. 97.) Here the larger portion of the rain comes in winter, when the moisture, brought from the ocean by the westerly winds, is condensed over the colder land. The moisture and the rainfall decrease to the east, and the crops that can be raised vary accordingly.

The constant moisture of the air of western Europe is of great importance in determining the kinds of industries that can be carried on. For instance, fibers of cotton do not break so easily when damp as when dry, and fine spinning can, therefore, be done only where the air is always moist, as it is about Manchester, England. The condition of the air which favors cotton spinning does not favor flour milling because wheat grains can be ground fine only when they are dry and brittle. Flour milling is, therefore, more successful in the eastern portion of the continent.

In the west, where the moisture is abundant, potatoes are largely cultivated. The warmth of certain parts of this area is sufficient for the grape to be produced as far north as the valley of the Moselle. Oats and barley, which also can be raised where the moisture is abundant, are found in the northwest, while wheat, which requires an abundance of sunshine, is found more particularly in central Russia, southern Italy, France, and Germany. Rye and flax are grown in the center of this climatic area.

The distribution of forest trees also varies according to the climate. In the north, especially in Scandinavia, the trees are mostly cone-bearing and evergreen. Toward the south some of the trees are deciduous and some evergreen, while in the extreme southern part of the area, as in similar regions in the United States, only deciduous trees, like the beech, oak, elm, ash, and maple, are found.

The extreme northern portion of this area merges into the *tundra* region with its extensive bogs, in which many flowers bloom luxuriantly in the short summer, but which are practically devoid of trees.

Revised, 1910

FIG. 376.

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Eastern Europe. In the broad plains, or tundra, of northeastern Europe the winters are severe. The climate is comparatively dry, because the winds have lost a large part of their moisture on the western highlands, and because the winter winds, blowing from the land rather than from the water, carry but little moisture.

Just to the south of the tundra is a forested belt containing cone-bearing trees, while south of the isothermal line of sixty degrees (average summer temperature) is the *black earth* and *steppe* region, which becomes increasingly dry to the southeast. Here abundant grasses are found and grazing is the chief industry. (See Fig. 119.)

Southern Europe. In winter the almost continuous wall formed by the Pyrenees, the Alps, and the Balkan Mountains prevents the cold winds of the interior from reaching southern Europe, which has in general a warm and balmy winter climate. The summers are practically rainless, and sunshine abounds. (See Fig. 84.)

Wheat and maize, both of which require prevailing clear weather, are the principal grains grown here. The character of the climate is best shown, however, by the extensive areas devoted to subtropical fruits, like figs, pomegranates, grapes, oranges, lemons, and olives.

In summer the high valleys of the Alps become health and pleasure resorts, while the southern shore of France and the northwestern coast of Italy, which are protected from the cold continental winds of winter, are much frequented in the winter season.

Distribution of Animals. The animals of Europe are distributed according to climate and vegetation. In the north the fur-bearing animals are found in great numbers. Here also are the reindeer which subsist upon the reindeer moss, one of the characteristic plants of the tundra area. (See Figs. 168 and 375.)

In the western rainy region and in the mountain valleys, where grass is abundant, great numbers of horses and cattle are raised. Sheep thrive in the southeast, where it is drier, and goats are also found in large numbers in the south and southeast. In the driest parts of southeastern Europe, as in that portion of Asia lying to the east and southeast, many camels are used.

The People of Europe. Europe is the most densely and completely inhabited of all the continents of the world. It is divided among many nations. The larger number of the people belong to the *white race* and the remainder to the *yellow race*.

The people about the Mediterranean Sea belong to the dark division of the white race. Most of them have dark hair and eyes and narrow heads, as we see in the Italians and the Spaniards, and speak languages that are somewhat alike. (See Fig. 156.) In the extreme north the people are fairer, with blue eyes, as is well illustrated by the Swedes. In Turkey, Finland, and in southeastern and northern Russia the native inhabitants for the most part belong to the yellow race, with the oblique eyes which characterize that people.

The languages which the people of Europe speak are various. Not only has almost every nation a distinct language, but many include several languages. Indeed, in some nations there are so many dialects that the people from one section can hardly understand the people from another part of the same country. With the increase in commerce and travel which has been so prominent in the last century, men have generally learned to speak more than one language, so that now one can travel in almost any part of Europe and be readily understood if he can speak either French or English.

Questions and Exercises

(1) Between what degrees of latitude does Europe lie? (2) What city in North America is in the approximate latitude of Gibraltar? Of London? (3) When it is noon at London what

time is it at Ottawa? At Valencia, Spain? (4) How many hours ahead of noon at Lisbon is noon at Peking? (5) Which is the longer, a January day at Paris or at Vancouver; at Naples or at Pittsburg? (6) Compare the length of a day at your home and at Edinburgh; at your home and at St. Petersburg.

FIG. 377. *Looking over the English lowlands, called "downs."*

(7) On an outline map of Europe write the names of the bays and seas. Locate the chief seaports and opposite each write its name. (8) Which countries have little coast line? Which have a long coast line? Which have none? (9) Which country of Europe is most favorably located for carrying on trade? (10) How is Russia hampered in the development of her commerce? (11) Why is not Norway, with her deeply indented coast, one of the most important countries commercially?

(12) On a map of Europe trace the divide between the rivers flowing north and those flowing south. (13) On the outline map used in Exercise 7 draw the chief rivers and write their names. (14) Fill out the following chart:

RIVERS OF EUROPE EMPTYING INTO				
Atlantic Ocean	*Mediterranean Sea*	*Black Sea*	*North Sea*	*Baltic Sea*

(15) Write in one column the names of the chief highlands of Europe, and opposite each the names of the countries they are in. (16) Locate Mont Blanc; Mount Etna; Mount Vesuvius. (17) Name and locate three active volcanoes. (18) On an outline map of Europe draw a dotted line separating approximately the region of moderate rainfall from the region of light rains. Write on the map the names of countries that have moderately heavy rainfall. (19) Draw a dotted line separating those countries that have dry summers and winter rains from the others, and write the names of these countries on the map. (20) Why does eastern Europe have light rains while the eastern United States has moderate and heavy rainfall? (21) Which section has the greatest range of temperature? The least? (22) Compare the annual range of temperature of Lisbon and San Francisco; of Moscow and Winnipeg. Account for this. (23) Why do the coldest winds come from the *east?* (24) What influence have the Alps on the climate of southern Europe?

(25) On the outline map used above color the tundra region and write the names of the plants and animals found there; do the same for the subtropical region; write the names of the chief vegetation products of the uncolored portion of the continent. (26) Draw the isotherms of sixty and seventy degrees average summer temperature and locate on the map towns having this temperature.

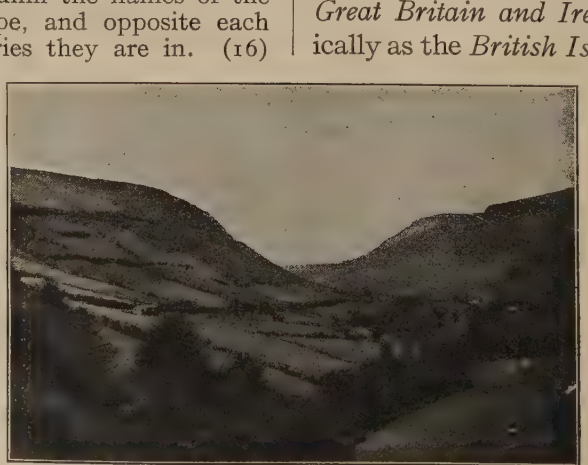

FIG. 378. *Glenariffe, near Larne, Ireland, where the highlands and lowlands meet.*

LI. THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND

The "Mother Country." The country of Europe with which our own country is most closely connected is the *United Kingdom of Great Britain and Ireland*, known geographically as the *British Isles*. (See Fig. 379.) It includes *England, Scotland, Wales*, and *Ireland*, and is known as the United Kingdom. We commonly call it the "Mother Country" because the United States has grown from a group of colonies formerly belonging to it. Its total area is nearly as great as that of the New England

FIG. 379.

Revised, 1910

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States, New York, and New Jersey. The population of the United Kingdom in 1901 was something more than half the population of the United States in 1900. Such a large population concentrated in so small an area means, of course, that the density of population is great, and that there is not room enough to raise all the products necessary to feed and clothe the people and make them comfortable. The average density in England and Wales is over 550 to the square mile.

FIG. 380. *Loch Lomond, Scotland. Notice the mountainous nature of the district.*

The United Kingdom is but a part of the great country known as the *British Empire*, which includes many colonies throughout the world; the most important of these are *Canada*, *India*, and *Australia*. (See Fig. 382.)

An Island Kingdom. The United Kingdom has not only the greatest number of colonies of any country in the world, but it is the most important country for its commerce. This is largely due to its position on a group of islands with an irregular coast line and situated at the center of the land hemisphere. To the east are the great nations of Europe, needing the supplies of the world at large, and on the other side of the Atlantic is our own country with its wealth of food materials far surpassing the needs at home. For this reason the United Kingdom has had a greater opportunity for commerce than any other nation of Europe. With no land frontier which must be protected, the nation has been free to devote its attention to manufacturing, shipping, and trading.

Coast Line. An elevation of the sea bottom around the United Kingdom, not to exceed six hundred feet, would make all this territory a great peninsula of Europe. (See Fig. 369.) The trade conditions would then be far different. The drowning which has separated these islands from the rest of the continent of which they are a part has also given the kingdom a large number of excellent harbors on all sides, and especially on the west. Its coast line is long, and it is so indented by inlets that there is no place within the kingdom more than seventy miles from the sea. This makes it possible for the products of any region to be carried to the sea at small cost, and the products of other countries can be shipped easily to the places where manufacturing is carried on.

Surface. Highlands, as we have seen, occupy most of the surface of Scotland, of northwestern England, and of Wales. A small but important lowland of fertile agricultural soil crosses Scotland from the Firth of Forth to the Firth of Clyde, while a far larger lowland area occupies the greater part of England. Ireland also is a lowland surrounded by low mountains. (See Figs. 377 and 378.)

The Distribution of Industries. Western England, because of the extremely rugged character of its surface and its abundant rainfall, and because of the great mineral wealth of its highlands, is naturally devoted largely to stock raising and to mining. The warm, moist climate and the fertile soil make the raising of sheep and the cultivation of grass and field crops the leading occupations of the rural districts in the lowlands to the east and southeast.

Climate. The climate of the United Kingdom may be described as *oceanic;* that is, it is largely determined by the fact that the country is surrounded by the ocean. The annual range of temperature is small, varying not more than 20 degrees over the larger part of the country. There is an abundance of rainfall.

FIG. 381. *Small Glen, Scotland, showing a road following the winding valley.*

Owing to the favorable climate, outdoor work can be carried on the year round in the lowlands. Southwest Ireland has a winter temperature as high as that of central Italy.

The distribution of the rainfall depends upon the winds and the position of the highlands. The western coast is rainy and the eastern is dry. In the Isle of Skye the annual rainfall is over 100 inches, while at London it is only about twenty-five inches.

The easterly winds are cold in winter, as they blow from the cold continent of Europe, but the mountain ranges like the *Pennines*, running through the center of the country, protect the region to the west. This accounts in part for the warmth of the winter climate about Manchester.

The title of *Emerald Isle*, which is sometimes applied to Ireland, suggests the greenness of the grass due to the warmth and moisture of the climate. The greatest amount of sunshine is on the coast, where the raising of wheat and barley is consequently of most importance. The extensive bogs formed by the glacial lakes furnish an abundance of peat for fuel. (See Fig. 383.) The swamp vegetation grows rapidly, owing to the moist climate.

Products of the Soil. The warm, moist climate and the fertile soil make the plains and valleys of the British Isles an exceptionally fine farming country, and the hills and more rugged slopes furnish pasturage for cattle and sheep. Two-thirds of the area of the United Kingdom is in grass, and agriculture and grazing are therefore the leading rural industries. But manufacturing and mining are so much more important that there are five times as many people in the mines and shops as are engaged in agriculture.

Oats are produced in the moist and cooler west and north, while barley and wheat, which need more sunshine, are raised in the south and southeast near the coast. Large quantities of garden vegetables are grown in Wales and Ireland. Turnips and potatoes are the leading vegetables in Ireland and in Scotland, while hops for the local breweries are raised in the south of England. Flax is an important crop in Ireland, where it is made into the famous Irish linen.

Cattle are extensively raised for beef, butter, milk, or cheese, which are largely sent to the principal cities. The sheep of Scotland make the best mutton and those of southern England produce the finest wool.

In spite of the richness of the soil, however, the United Kingdom does not produce enough

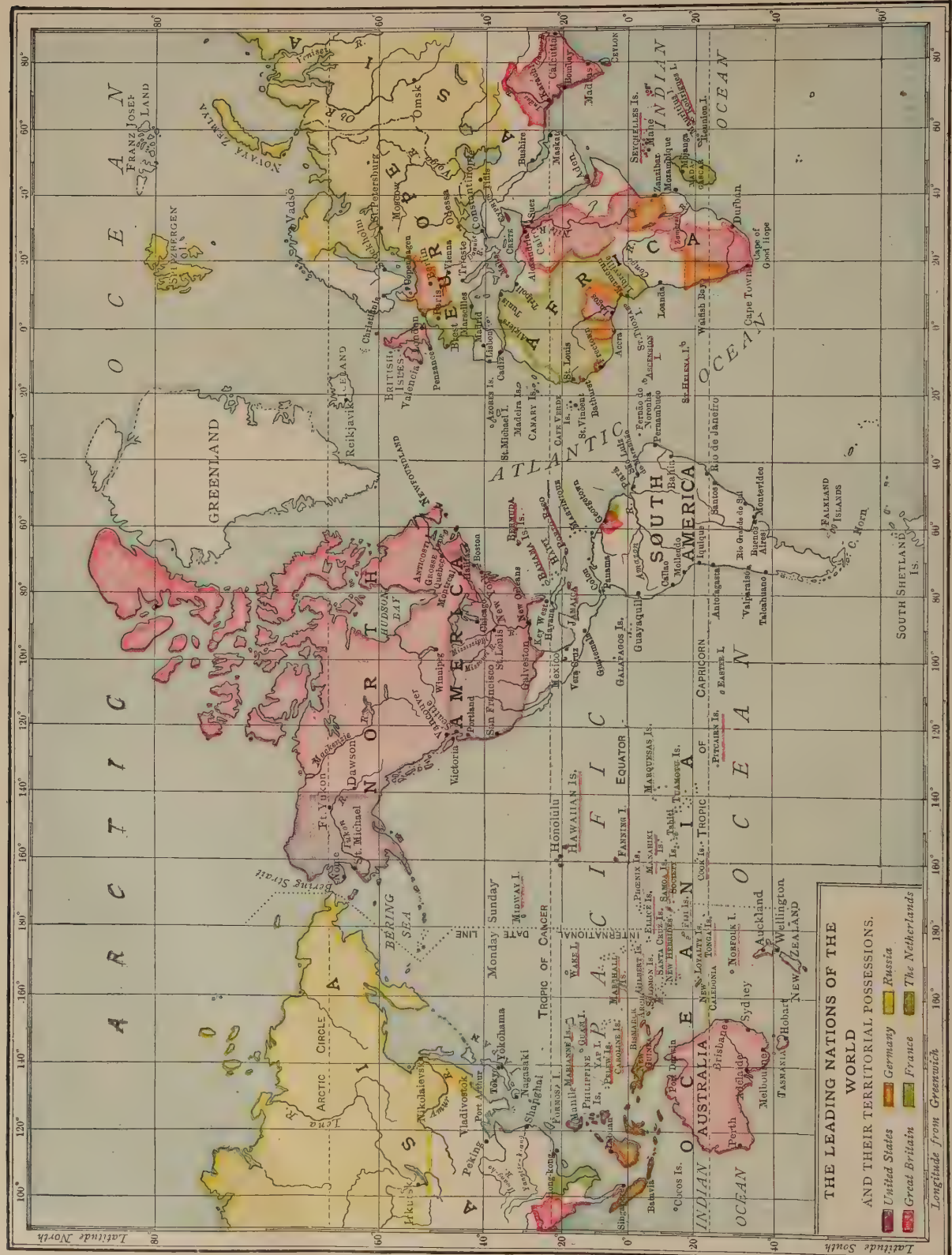

FIG. 382.

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food for its own people or sufficient wool for its numerous and extensive manufactories. This is what we should expect in any country where only one person in twenty is engaged in tilling the soil.

FIG. 383. *Interior of a cottage in Ireland. The grate burns peat.*

Mineral Products. Coal and iron are the principal minerals; tin is found in England in valuable quantities, and slate, granite, salt, and pottery clay are common in certain regions. The United Kingdom was the largest producer of coal until 1898, when it was surpassed by the United States. It is the second coal-producing country of the world. In the production of iron it ranks third, being exceeded by both the United States and Germany. (See Figs. 384, 385, 590, and 591.)

The coal and iron of the United Kingdom are found close to deposits of limestone, which is necessary for the purification of the iron. England especially has large deposits of coal and iron near each other and hence is well fitted to become one of the leading manufacturing countries of the world.

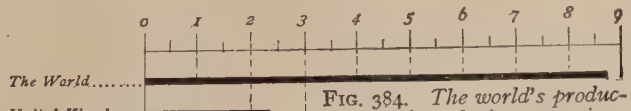

FIG. 384. *The world's production of coal, in 1904, in hundreds of millions of long tons.*

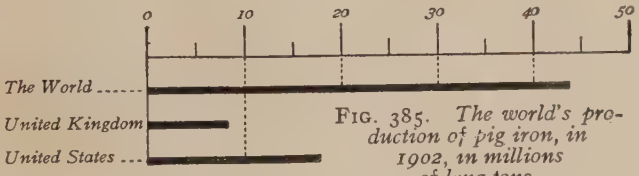

FIG. 385. *The world's production of pig iron, in 1902, in millions of long tons.*

Coal is found principally in the valleys of the *Clyde*, *Severn*, and *Trent* rivers, and in the districts about *Newcastle* and *Manchester*. The coal fields of the coast are centers of shipbuilding, while the interior coal fields are centers of woolen and cotton manufacturing. Great quantities of coal are sent to other countries as ballast in vessels which bring back the necessary food products and raw materials for manufacturing. Coal is the only raw product of the United Kingdom which is produced in greater abundance than is needed for home use. It is sent principally to those countries on the continent of Europe which are lacking in fuel.

Fisheries. The nearness of the British Isles to the great fishing grounds of the North Sea and of Iceland, combined with its deeply indented coast and large manufacturing population to be fed, has made fishing one of the great industries along its coast. More than 100,000 people of the United Kingdom are thus engaged, and fish is the only food product of the region which is adequate to the demand for it. In fishing the United Kingdom stands second only to the United States. *Hull*, *Grimsby*, *Great Yarmouth*, and *Harwich* are the principal fishing centers, but all the coast towns contribute to this industry. The fishing vessels go far out into the Atlantic, many go even to the shores of Iceland, though the chief fishing grounds are over the Dogger-Bank in the North Sea. Haddock, herring, cod, and mackerel are the chief food fishes, and herring are exported in large quantities.

Manufacturing. The British Isles are situated midway between the great land masses of the world. Raw products can be brought

to them easily and cheaply by water and then shipped to other countries as manufactured products. There is no land border to defend, and the people have been free to devote themselves to the development of their industries. All these natural advantages combined for many years to make the United Kingdom the leading manufacturing nation of the world, but now it is second to the United States. Owing to the conditions of moisture and temperature and the excellent supply of coal and iron, cotton, woolen, and steel manufacturing are the chief forms of this industry. More than 1,000,000 people are engaged in cotton and woolen manufacturing, chiefly in or about the large cities which have grown up near the coal and iron fields.

FIG. 386. *The Houses of Parliament, from the rear. The laws of the Kingdom are made here.*

Owing to the favorable climate, the greater part of the cotton manufacturing is carried on west of the Pennines. The chief manufacturing cities are *Manchester*, noted for its cotton, and *Leeds* for its woolen goods. *Birmingham* makes railroad iron and supplies, and *Sheffield* is widely known for its cutlery.

Spinning is important near the flax fields of Ireland, especially at *Belfast*. The famous Paisley thread is made in southern Scotland.

The great shipbuilding center is on the Clyde. *Glasgow*, Scotland, is the chief city for this industry.

Trade. Owing to its wealth of manufactures and to its situation, the United Kingdom has an enormous trade with all parts of the world. In fact, it carries on about one-sixth of the total trade of the world. (See Fig. 387.) The larger part of this is centered at the ports of *London*, *Liverpool*, *Hull*, *Southampton*, *Cork*, and *Glasgow*. The coast and the interior trade also are very large because the country is well supplied with railroads and the more important navigable rivers are connected by canals.

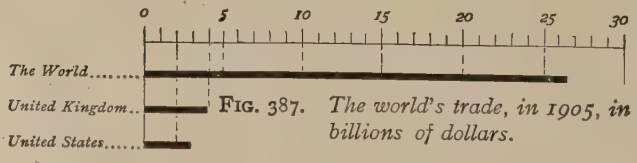

FIG. 387. *The world's trade, in 1905, in billions of dollars.*

London, with its magnificent natural harbor afforded by the estuary of the Thames, was preëminently fitted to become the leading commercial city of the world. It is situated almost at the center of the Land Hemisphere; to the east are the thickly populated nations of Europe, which cannot supply their own needs; to the west is America with its abundance of raw material; behind it are the great manufacturing cities of England; and what is more, it is the capital of the richest and most powerful empire of to-day. All these advantages combined have made London the leading center of trade and the most populous city in the world.

Imports. Nearly one-half the imports into the United Kingdom come from the English colonies and the United States; more than one-fifth of all the imports are secured from the United States alone. Cattle and hogs, cereals, and raw cotton are imported from the United States in large quantities. Cotton is also secured from India and Egypt, and wool is imported principally from Australia and South Africa. The imports from

Australia and South America are very largely animal products.

Exports. The United Kingdom exports more manufactured goods than any other country, and nearly one-half of the exports are cotton and woolen goods. Cotton goods are sent chiefly to the warm countries of the world, while woolen goods are sent to the cooler regions like northern North America, Australia, and the Argentine Republic. Only about one-fifteenth of its export trade is with our country, and this consists chiefly of woolens, cottons, and linens. Its export trade with its colonies far exceeds that with any one country.

FIG. 388. *English cottages near Warwick.*

FIG. 389. *A slow-moving English river at Cambridge.*

London carries on the larger part of the trade with the eastern countries, while *Liverpool* leads in the trade with the United States. *Hull*, owing to its position, is an important port for commerce with the countries of northern Europe. *Cardiff* and *Newcastle*, owing to their nearness to the rich coal fields, are the two leading coal-exporting cities of the world. *Manchester*, the chief manufacturing city, is now connected with *Liverpool* by a ship canal (see Fig. 374) and is growing rapidly as a port. The United Kingdom, and especially England, which is the mother country of all the English-speaking peoples the world over, is in some ways of more interest to us than any other country.

FIG. 390. *Looking over Keswick, England, with the lake and the mountains beyond.*

The English people have always been noted for their respect for law, for their ability to adapt themselves to new conditions in new countries, and for their enterprise in developing commerce and manufactures. They have always been progressive and persevering in spite of difficulties. Hence they have won where others failed and their colonies, planted widely and in regions rich in natural resources, have grown great and wealthy, and have become powerful and important members of the British Empire.

Geographically at the center of the English-speaking world and closely in touch with all other countries in which the same language is used, the United Kingdom retains its position as the leading commercial nation.

Scenery. Many of the cities and rural districts of the United Kingdom are visited yearly by large numbers of people because of their historic interest, literary associations, or scenic beauty. (Figs. 388, 389, and 390.)

London, as the historic capital of the British Empire, is the chief city of interest. Here are the *Houses of Parliament* (see Fig. 386), in which the governing bodies meet, *Westminster Abbey*, in

which kings and queens and famous men are buried, and many other places of equal interest. Many of the towns of England are noted for their cathedrals.

Old cities like *Edinburgh* (see Fig. 391) and *Stirling*, which have been centers of historic incidents, attract many tourists.

The mountains and the lakes of northern England, southern Scotland, and Ireland are favorite regions with travelers because of their beauty. (See Figs. 380 and 381.) The Highlands of Scotland afford fishing and hunting.

Questions and Exercises

(1) On an outline map of the world color in red the United Kingdom and its chief colonies. (2) Draw the most important ocean routes which connect the United Kingdom with its colonies and write the names of the bodies of water crossed by these routes.

(3) On an outline map of the British Isles write the names of the chief estuaries; locate a harbor on each. (4) Write in one column the names of the chief seaports that are at or near the mouths of rivers, and opposite each port write the name of the river it is on.

FIG. 391. *Prince's Street, Edinburgh. Notice the castle on the left and the monument to Walter Scott in the center.*

(5) Write a composition on "How the Products of the United Kingdom are Affected by its Climate and Surface." (6) On the outline map used in Exercise 3 draw a line dividing manufacturing England from agricultural England; in each portion write the names of the chief products. Use symbols, or abbreviations if you like, to represent the mineral products. Try to make the map attractive. (7) On this map write the names of the most common fish in the waters in which they are found, and draw arrows from these waters to the chief fishing towns.

(8) What are the advantages of the position of London with regard to England? (9) What continental ports does it face? (10) What ocean routes does it command? (11) Trace the route that would be followed by a sailing vessel from London to Australia. By what route would it return? What large cities in the United States were named after cities in England? (12) Find out, if possible, how London is supplied with food. (13) On an outline map of England, color the chief mineral regions and locate the manufacturing towns. (14) Draw railroad routes from these towns to the ports from which their manufactures are exported. (15) Make a small sketch map of England and show by arrows, or in whatever way you can, the chief exports and the countries to which they are sent.

LII. ICELAND

Surface and Climate. Iceland, the largest island of Europe except Great Britain, belongs to the kingdom of Denmark. (See Fig. 374.) It is about the size of Kentucky and lies on the edge of the temperate belt. In the south it has a moderate winter climate with an average January temperature like that of New York City and northern Norway. Its harbors rarely freeze. The climate is wet and stormy and agriculture is carried on with difficulty. The island has many highlands in the north, and several volcanoes, geysers, and glaciers that are of considerable interest.

Products. Hay, cattle, and sheep are the leading products. Grass is secured with so great difficulty that it is even planted on the roofs of the houses, where the warmth of the interior secures a good return. The inhabitants live mainly along the coast, where they carry on a certain amount of fishing. The sea about Iceland is a good fishing ground and is much frequented by fishermen from western Europe. There is no manufacturing on the island and little mining. The people are not progressive.

Trade. As the roads are poor and as there are no railroads, many horses are raised for use in travel. The inhabitants secure great profit from the eider down gathered from eider ducks, which breed there in the summer, and from the fisheries. *Reikjavik* is the only town of any importance.

FIG. 392. *Calais, the French port nearest England.*

Questions and Exercises

(1) Study the map of Europe, especially the ocean, and tell why Iceland belongs to Europe rather than to North America. (2) What curious custom in Iceland is a result of its climate? (3) How can horses and cattle be raised if hay is grown with difficulty? (4) What fish are caught in the surrounding waters? (5) What countries of Europe send fishermen to Iceland?

LIII. FRANCE

Position and Coast Line. France lies on the windward side of Europe and is separated from the United Kingdom by the narrow *Strait of Dover* and the *English Channel*. (See Fig. 394.) Surrounded by water on three sides, it has a long coast line, yet it has few good harbors, because the coast is so regular.

The great indentations, the *Bay of Biscay* and the *Gulf of Lions*, are both stormy, hence commerce along these coasts is conducted at a great disadvantage. The best harbors are *Le Havre*, important for its trade with America; *Calais*, the port nearest the United Kingdom; *Bordeaux*, which has a large trade with South America; and *Marseilles*, the leading port, which trades chiefly with Africa and the rich countries of the East Indies. (See Figs. 376, 392, and 393.)

FIG. 393. *Bordeaux, along the quays. This port carries on a large trade with South America.*

France is fortunate in having a coast line on the Mediterranean, because the United Kingdom controls the *Strait of Gibraltar*, and in case of war could easily prevent French vessels from passing between the Atlantic Ocean and the Mediterranean Sea. The total area of France is about equal to that of the New England States, New York, Pennsylvania, and Ohio combined.

France has many foreign possessions scattered over the world; the most important are *Algeria*, the *Sahara* and *French Western Africa*, *Madagascar*, and *French Indo-China*. Most of these possessions furnish many valuable products to the home country.

Surface. Northern and northwestern France lie in the great low plain of northern Europe. The general trend of the slopes is to the west and northwest, and hence the longer rivers run in this direction.

The larger part of central France is a plateau which rises from the valley of the Rhone in the steep wall-like front known as the *Cevennes*. The plateau slopes down from this rim to the western coastal lowland. It contains the volcanic region of the *Auvergne* (see Fig. 395),

WESTERN EUROPE
SCALE
0 10 20 30 40 50 100 150 200
155 Statute Miles to one inch
Capitals of Countries ☆ Other Cities •
Relative importance of places shown by size of type
ATLANTIC OCEAN
NORTH SEA
ENGLISH CHANNEL
BAY OF BISCAY
MEDITERRANEAN SEA
ENGLAND
WALES
IRELAND
FRANCE
SPAIN
PORTUGAL
GERMAN EMPIRE
THE NETHERLANDS
BELGIUM
SWITZERLAND
ALGERIA
BALEARIC ISLANDS
MINORCA
MAJORCA
IVIZA
GULF OF LIONS
St. Georges Channel
Lands End
C. de la Hague
Channel Is. (Br.)
Ushant I.
I. de Noirmoutier
I. de Ré
I. d'Oléron
C. Finisterre
C. Ortegal
C. de Creus
C. de la Nao
Str. of Gibraltar
Cape St. Vincent
Cape Sagres
Cabo da Roca
Seven Caves
Longitude West from Greenwich
Longitude East from Greenwich
Latitude North
Revised, 1910

and the famous limestone cave region of the *Causses*, on the west slope of the *Cevennes*.

In the northwestern peninsula of Brittany there is a small upland region commonly called the *Hills of Brittany*. Along the southwestern coast is a large area of moving sand dunes known as the *landes*. The westerly winds are continually carrying these sands farther and farther inland, and in this way great damage has been done to the vegetation. This region naturally has a very small number of inhabitants.

FIG. 395. *A fertile slope on the side of one of the old volcanoes in the Auvergne region.*

On the east are the *Jura Mountains* and the beginning of the great highland of the *Alps* (see Fig. 396), which extends close to the sea east of Marseilles. At the north end of the French Alps is the highest peak in Europe, *Mont Blanc*, 15,775 feet in height.

Rivers. The great rivers flow down the slopes to the west or are confined in narrow valleys between the mountain ranges, as is the case with the *Rhone*. France controls the whole of each of her rivers except the tributaries of the *Rhine*, which flow out between the mountains and through the Netherlands and Germany. Owing to the fact that all the great rivers of France—the *Seine*, the *Loire*, and the western tributaries of the *Rhone* and the *Rhine*—have their sources near together on the Central Plateau, it was very easy to connect the upper courses of these rivers by canals and thus form a network of waterways crossing the country in every direction. These canals greatly stimulate the interior trade of France.

FIG. 396. *Hay-making in eastern France. The Alps are seen in the distance.*

Climate and Rainfall. Owing to the nearness of France to the sea and to the protection afforded by the mountain barrier on the east, its climate is very even. The climate of the mountains and the plateau is of course more severe than that of the protected plains to the west and north, and for that reason there is a considerable range of temperature from the mouth of the Loire, where frost is practically unknown, to the perennial snows of the higher Alps.

Owing to the influence of the mountains and the plateau, the rainfall is unequally distributed. The greatest annual rainfall is along the north side of the Pyrenees, where it is about the same as at New Orleans. The least is along the Mediterranean coast, where it is about as great as in eastern Kansas. (See Fig. 97.)

The southern coast east of Marseilles, being protected from the cold northern winds, has become a great winter resort and is known as the *Riviera*. Along the southern coast, however, especially from Montpellier to Toulon, there is frequently in winter a severe cold wind, known as the *mistral*, which blows down from the *Central Plateau*. This occurs when the air is cold and heavy over the

plateau and warm and light along the coast. Under these conditions the air moves quickly and the wind may be severe enough to cause a great amount of damage; it has even been known to blow carriages over in Marseilles.

Products of the Soil. France is distinctly an agricultural country, and nearly one-half its people live on farms. On the plains, which extend for about one hundred miles inland from the English Channel, the climate is mild and moist; pastures and orchards abound. In the damp, warm areas of the lower Rhone and along the southern coasts the olive and the mulberry are raised in large quantities. Silkworms feed on the leaves of the mulberry tree, and hence the production of silk is an important and thriving industry in the southeastern part of France.

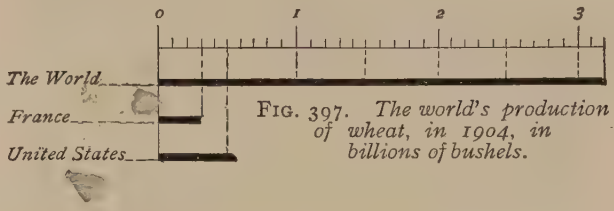

FIG. 397. *The world's production of wheat, in 1904, in billions of bushels.*

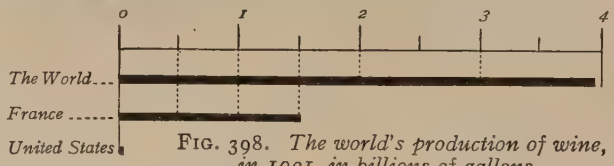

FIG. 398. *The world's production of wine, in 1901, in billions of gallons.*

Wheat, which occupies one-sixth of the cultivated land, is the most valuable cereal, especially in the basins of the Loire and the Seine. (See Fig. 397.) The demand for wheat is very great, as the people live largely on white bread, but in spite of the abundance of the wheat crop in France, only about nine-tenths of the amount necessary for home consumption is raised. Oats are the second cereal in importance. Rye and barley are raised on the poorer soils of the coast and in the highlands. On the plains of the north, where the slopes and soil are favorable, potatoes and sugar beets are raised in large quantities, especially for making raw sugar and alcohol.

The warm, sunny climate and fertile soil of France combine to make it the greatest grape-raising and wine-producing country in the world. Grapes do not flourish in the north, but from the Loire southward the vineyards occupy every favorable nook on the warmest and best protected slopes, and give the region an appearance of thrift and beauty. The most important vineyard areas and the leading wine-producing regions are in the east. Wine is the second largest export. (See Fig. 398.)

Stock Raising. Cattle raising is extensively carried on, especially among the hills of the northwest. This part of the country produces a large amount of butter, which is sold principally in Paris and London. In Normandy and in southern France a great quantity of cheese is made, of which the most famous kind is *Roquefort*, made from the milk of ewes and cured in limestone caves. (See Fig. 399.) Horses are raised in the north, and from this region come the famous *Normandy* horses, much used for draft purposes in our own country. In the warmer regions of the south, especially between the mouth of the Loire and the Pyrenees, mules are raised in great numbers.

FIG. 399. *Making Roquefort cheese in limestone caves.*

Minerals. The principal minerals of France are coal, iron, and salt. These are not widely

scattered, however, and for this reason the industries which depend upon them are centered about a few regions only. The principal coal and iron deposits are along the Belgian frontier and in the eastern highlands. Near these regions are found the great manufacturing towns of *Lyons*, *St. Étienne*, and *Lille*. Salt is found along the western coast from the Garonne to the Loire and about Nancy.

Fishing. France ranks high as a fishing country, and consumes a great quantity of the product. The fish caught are largely cod from the Atlantic, and from about certain small islands near Newfoundland, owned by France, and which serve as the base for the fisheries on the Newfoundland banks. Oysters are found in the Bay of Biscay and in the English Channel. Sardines are found along the northern and western coasts, and are canned and sent to all parts of the world.

FIG. 400. *Lyons, the leading silk market of the world.*

Manufacturing. France ranks fourth among the manufacturing countries of the world; it is surpassed by the United States, the United Kingdom, and Germany, all three of which have richer deposits of coal and iron and better opportunities for carrying on ocean commerce. France excels, however, in the quality of its products. The manufacturing is scattered, owing to the general lack of fuel, and the largest centers are near the coal fields. Iron and steel working are the principal occupations at *St. Étienne*, near the eastern coal field. *Marseilles* and *Bordeaux* are also steel cities, but their product is made largely from iron imported from Spain, where rich iron ore is found in great quantities. *Paris* is a manufacturing center for jewelry, gloves, and other goods of a similar nature.

Textiles. In textile manufacturing France leads the world. More than one million people are employed in this industry. Silks are woven in great quantities about *St. Étienne* and in the vicinity of *Lyons* (see Fig. 400), which is the world's greatest silk market. The proximity of mulberry groves and coal deposits, and the fact that the water from the mountain streams is especially good for dyeing, make the success of the industry very great. Linens are made near the coal fields of the Belgian frontier, and especially at *Lille*. At *Rouen*, cotton goods are manufactured; the power is largely furnished by coal imported from England.

Domestic Trade. Owing to the fine system of railways and interior waterways, and to the several available harbors, France is the fourth country in the world in commercial importance, and has nearly one-twelfth of the world's trade. (See Fig. 402.)

The direction of the slopes and the rivers leads most of the interior trade routes toward *Paris*, the largest city on the continent, yet only a little over one-half as large as London.

Foreign Trade. About one-fifth of the trade of France is with the United Kingdom, so close at hand, and less than one-tenth with the United States. The largest exports are textiles, small goods of artistic value, and wine. Its largest imports are food products and raw materials for manufacturing, including wool and coal from the United Kingdom, lumber from Sweden and Norway, and cotton, petroleum, meats, and cereals from the United States. *Le Havre*, the great cotton port, receives its cotton direct from the southern ports of the United States. About one-eighth of the

FIG. 401. *A view of Paris, looking toward Notre Dame Cathedral and City Islands.*

imports are received from our country, while only 6 per cent of the exports are sent to the United States.

It is interesting to note why Paris, the capital of France, has not grown so rapidly as London, which is only about two hundred miles away. Paris is beautifully situated in the fertile valley of the Seine; it has excellent waterways connecting it with the great manufacturing centers of France. But it is seriously handicapped by its inland position. Were the Seine as broad and deep as the Thames, Paris would doubtless have become the distributing center for French manufactures, which are now sent to a half dozen lesser ports to be shipped to different parts of the world. Another reason why we should expect Paris to be a smaller city than London is the lack of coal and iron in the country to develop manufacturing to the extent to which it has developed in England. A third reason is that the colonies of France, when compared with those of England, are unimportant, and the amount of trade which they bring is limited when compared with the volume of commerce which the English colonies bring to the capital of the British Empire.

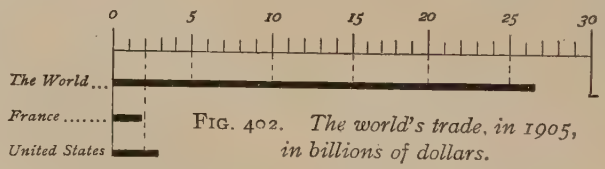

FIG. 402. *The world's trade, in 1905, in billions of dollars.*

People. In the large cities of France, and especially in Paris, the people are very polished and fond of excitement. The latter characteristic is expressed in their manner of speech, in their movements, and in their fondness for political struggles. In the rural communities, on the contrary, the people are more slow of speech and action, more satisfied with the monotony of their daily life, and less easily excited.

The rural life of one province is often different from that of another, because the people are of different ancestry and hence of various dispositions. In many of the provinces women share the hard outdoor labor with the men, and in some cases perform the larger part of the farm work. They labor in the fields during the day and care for the household, and in some cases the dairy, morning and night.

Scenery. France is especially noted for the beauty of its cities. Paris is one of the most beautiful and interesting of cities (see Figs. 401, 403, and 404), and is annually visited by many tourists. Because of its magnificent art galleries, the most noted of which is the *Louvre* in an old and historic palace, and because the French are extremely artistic, Paris has become the art center of the world. Students of art come to it from all parts of the world to study under famous artists.

The scenic beauty of France that is of interest to the traveler and visitor is found

FIG. 403. *The beautiful boulevards of Paris from the Arc de Triomphe.*

along the coast of the Riviera; in the hills of Brittany, noted for their picturesque peasant life; in the cave region of the Causses, and in the Auvergnes.

MONACO AND ANDORRA

Position and People. In southeastern France, just east of Nice, is the independent principality of *Monaco*. It is in the most favored portion of the Riviera, and is visited by many tourists. Its revenues are derived from the gambling tables of Monte Carlo, situated close by Monaco, its capital.

High up among the Pyrenees lies the little republic of *Andorra*. It is inhabited by a sturdy race of peasants who have maintained their independence for centuries.

FIG. 404. *Looking over the housetops in the poorer districts of Paris.*

Questions and Exercises

(1) On an outline map of the world color France and its chief possessions in blue.

(2) What is the importance of a mountain boundary such as the Pyrenees? (3) In what way are the natural boundaries of the United Kingdom superior to those of France? (4) What advantage has this superiority given the United Kingdom over France? (5) What river forms a great highway into Switzerland?

(6) Draw a sketch map of France showing the Loire, the Seine, the Garonne, and the Rhone rivers. (7) Draw the canal connecting the Garonne with the Mediterranean. (8) What can you say of the advantages France has for internal trade?

(9) Why does the Riviera have little rain while the north slope of the Pyrenees has heavy rainfall? (10) Why should northeastern France have greater extremes of climate than the Rhone Valley? (11) Why should France be more of an agricultural country than a manufacturing country? (12) Where are her prairies, and what is raised on them? (13) What part of the country has furnished sailors, and why?

(14) Make a list of the manufacturing towns of France; opposite each write the names of the articles manufactured, and in a third column the reasons for this.

(15) What are the particular advantages in the location of Rouen, Paris, Orleans, Lyons, and Brest? (16) Why is there no town at the mouth of the Rhone? What is the chief importance of Calais and Boulogne? What are some of the things in Paris that make the city beautiful?

LIV. THE IBERIAN PENINSULA

SPAIN AND PORTUGAL

Size and Boundaries. The Iberian Peninsula, which has about twice the area of Arizona, contains the two nations, *Spain* and *Portugal*. It is nearly surrounded by the sea, and is separated on the north from France by the high barrier of the Pyrenees. These mountains have few passes, so that land communication with France is difficult.

Owing to the regular shore line there are few good harbors. Portugal, which has the best harbors, is a maritime nation of some importance.

Possessions. Portugal has large possessions in Africa, including *Angola* and *Portuguese East Africa;* it holds some islands in the Pacific, and the *Azores*, the *Cape Verde*, and the *Madeira* islands (see Fig. 405), in the Atlantic. Spain possesses the *Balearic Islands*, the *Canaries*, a few islands off the coast of Africa, and a narrow strip of the Saharan coast. Until 1898 Spain owned *Cuba*, *Porto Rico*, and the *Philippines*, all of which were lost during the Spanish-American war.

Surface and Drainage. Three-fourths of the area of the Iberian Peninsula is a great plateau averaging about twenty-five hundred

FIG. 405. *The mode of street travel in the Madeira Islands.*

feet in height, that is, higher than the Cumberland Plateau in the southern Appalachians. This plateau is broken by numerous ridges of nearly parallel mountains known as sierras. The most southern range is known as the *Sierra Nevada* and is separated from the rest of the plateau by the broad valley of the Guadalquivir River.

Owing to the form of the land and to the youthful character of the streams, the rivers are interrupted by numerous rapids and shallows and are not navigable for any great distance. The *Guadalquivir* is the most important exception; vessels can ascend it to *Seville*. (See Fig. 406.)

FIG. 406. *A general view of Seville.*

Climate. The climate of the Iberian Peninsula is characterized by very marked differences between summer and winter. In winter the region lies in the path of the westerly winds, but in summer it is occupied partly by the horse latitudes and partly by the northeast trade winds. Therefore the winters are moist and the summers extremely dry.

As the westerly winds rise to reach the interior plateau they become cooler and lose a large part of their moisture, so that the western coast receives a fairly abundant rainfall in winter.

The barrier of the Pyrenees protects the peninsula from the cold continental winds of northern Europe. In fact, the climate of the peninsula is more like that of Africa than that of Europe. Hence it is often said that Africa extends to the Pyrenees.

Owing to the dryness of the summer climate, agriculture can be carried on in most places only by means of irrigation. This has been practiced for centuries, however, and large areas have been changed from deserts into fertile garden spots.

Products of the Soil. About one-fourth of the people of Spain and Portugal are engaged in agriculture, which is most profitable in the more rainy region of the northwest and along the coasts where irrigation is practiced. The interior is so dry that even grass is scanty, and grazing is the leading industry there. Sheep-grazing is of especial importance; the number of sheep is greater in proportion to the population than in any other country of Europe. In the northwest wheat and barley are grown, and cattle are raised, principally for local use.

In the irrigated lands fruits, sugar cane, olives, cork oak, and the vine are grown in abundance. Wine is the leading product.

FIG. 407 *The Escorial near Madrid, a famous building of Spain.*

This is particularly true in the valleys of Portugal.

Minerals. The mineral products of the Iberian Peninsula are extremely valuable, especially in the northern and southern mountains. The iron of the north is very rich and pure and is extensively worked. Coal is generally distributed, but is little worked. Spain produces more quicksilver than any other country except the United States, and ranks next to the United States and Mexico in copper production. It also contains rich deposits of lead and silver. Owing to the lack of good transportation and to the backwardness of the people, however, the mineral resources have not been developed as they would have been in a more progressive country.

FIG. 408. *The large public square, Lisbon.*

Manufactures. Manufacturing in Spain and Portugal is not very important and the products do not supply the home demand. In this respect these countries form a striking contrast to the United States and the United Kingdom, each of which has developed great manufacturing districts near its coal and iron mines.

Spain and Portugal, with their regular coast line, have few good harbors. They have no great interior waterways and few railroads. This has prevented the development of iron and steel manufactures, and the importation of raw material for textile manufactures.

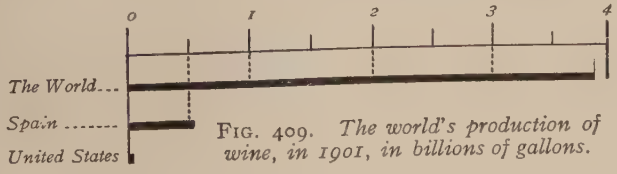

FIG. 409. *The world's production of wine, in 1901, in billions of gallons.*

FIG. 410. *Lisbon harbor.*

Iron and machinery are made in increasing quantities in the north, and textiles are produced at *Barcelona*, *Lisbon*, the capital of Portugal (see Figs. 408 and 410), and *Oporto*. *Granada*, famous because of the Alhambra (see Fig. 412), also produces some textiles.

Madrid (see Fig. 407) manufactures gold and silver articles, glass, and china. Its chief importance, however, is due to its being the capital of Spain.

Trade. Owing to the lack of railroads and navigable rivers the internal commerce of Spain and Portugal is small. Wine forms a large part of the exports (see Fig. 409), and is sent chiefly to France and the United Kingdom. Oranges, lemons, olives, and cork are also important exports. The greatest trade is with the United Kingdom and France. Owing to the few available passes over the Pyrenees a large part with France is by water. The chief imports are cotton from the United States, wheat from Russia, timber from Sweden, and woolens from France.

Barcelona, the chief port of Spain, is the most enterprising city, though *Valencia*, with exports of silks and oranges, and *Malaga*, with grapes and wines, are also important. *Oporto* is the chief outlet for the foreign trade of Portugal, and gives its name to port wine, a leading article of export.

FIG. 411. *The rock of Gibraltar, from the lowland peninsula connecting it with Spain.*

People. Owing principally to the geographic position of Portugal, the people have always been active in maritime affairs, carrying on commerce with the distant parts of the world. The Spaniards, on the other hand, were not content with trade, but endeavored to subjugate all the new countries possible, so that they could own vast riches of gold and silver. Spain was at one time a great colonizing nation, but through mismanagement the colonies have gradually been lost.

The Spaniards, like most people who live in subtropical areas, are impetuous and fond of amusement and excitement. They have many holidays and feast days, when all work stops and every one devotes himself strictly to amusements. The people of the northern provinces are more thrifty and differ strikingly from their countrymen in the south.

GIBRALTAR

Position. On the very southern point of Spain where it approaches nearest to Africa is the small peninsula known as *Gibraltar*. This is heavily fortified and belongs to the United Kingdom. As the Strait of Gibraltar is only eight miles wide, the United Kingdom really controls the entrance to the Mediterranean through this fortress, its guns commanding nearly the whole strait. (See Fig. 411.)

Questions and Exercises

(1) Find out how the area of Spain and Portugal compares with the state in which you live. (2) Through what part of Spain does the Greenwich meridian pass? (3) How much of Spain lies in east longitude?

(4) Make a list of the chief rivers of the Iberian Peninsula and opposite each write the name of the body of water into which it empties. Mark with a star those rivers which are forming deltas. (5) On which coast are the delta-forming rivers most frequent? Why? (6) Where do you find a fiorded coast line? (7) What good harbors are on these fiords? (8) Why is there no town at the mouth of the Guadalquivir River? (9) What does the word *sierra* mean? To what mountains in North America is it applied?

(10) Tell how the climate of Spain is affected by its latitude; by its surface. (11) In what way is the surface of this peninsula like that of Africa? (12) Why should the west coast have more rain than the east coast? (13) Why do the winds blow from the sea toward the land in summer?

(14) What are the industries of the west and northwest of the peninsula? Of the interior? (15) In what way are the industries influenced by the climate? (16) Where are oranges, grapes, and cork oak grown?

(17) What hinders the internal commerce of Spain? (18) What great continent suffers from the same drawback? (19) Compare France and Spain in this respect. (20) On an outline map

FIG. 412. *The Alhambra, a great stronghold and palace at Granada, Spain.*

draw the most important rivers. (21) Locate the chief ports and write near them their leading exports. Draw arrows to show where these are sent. (22) On the margin of the map write the names of the chief possessions of Spain and Portugal. (23) Locate the chief inland towns. (24) Give the chief reasons for the location of Seville.

LV. BELGIUM, THE NETHERLANDS, AND DENMARK

Position and Coast Line. *Belgium*, the *Netherlands*, and *Denmark* are each small but important nations bordering on the Atlantic. Their combined area is nearly as large as that of Kentucky. Owing to their several excellent harbors and the position of the

FIG. 413. *Antwerp, on the Scheldt River, the great distributing point of Belgium.*

Netherlands at the mouth of the great Rhine waterway, which is an exceedingly valuable commercial route for Germany, they are important countries commercially.

Belgium has about forty miles of unbroken coast, with no harbor except the small one of *Ostend*, which is connected by steamship lines with *Dover*, England. Its chief port is the river port of *Antwerp* (see Fig. 413), access

FIG. 414. *Along a canal, Amsterdam. Much of the city's transportation is by water.*

to which is controlled by the Netherlands, as the Scheldt flows through that country.

The Netherlands, on the other hand, has two excellent harbors, *Rotterdam* and *Amsterdam*, of which the former is the more important. Amsterdam, however, is connected with the Atlantic by a ship canal, so that its position on the *Zuider Zee* is to a certain extent made up for by this direct connection with the great ocean. (See Fig. 376.)

Denmark is made up of several large islands and a peninsula, so that it has but little land boundary. (See Fig. 422.) It is not very important commercially because there is not enough land to furnish a great quantity of products for oceanic commerce.

Surface. These three countries are all low, and the coasts are largely sand dunes, which form good watering places, especially in Belgium. Almost all of the coastal portion of the Netherlands is below the level of the sea,

and the water is kept from advancing upon the land only by high dikes which are built as a protection against the waves. Thirty-eight per cent of this country would be overflowed but for the dikes. (See Fig. 415.) In northwestern Belgium there is a great region known as the *polders*, which has been reclaimed from the sea and is now used for pasturage.

In the Netherlands the gentle slopes are occasionally broken by glacial deposits which form the only hills in the region. Denmark is very flat and sandy and contains many marshes and lakes. In the peninsula of *Jutland* many of the lakes have become peat bogs.

FIG. 415. *In the dike-protected districts of the Netherlands.*

Drainage. The rivers of the Netherlands and Belgium rise farther inland and flow through these countries to the sea. In the Netherlands the land is so low and flat and the divides are so inconspicuous that a vast network of canals has been built to connect the rivers. As a result the country abounds in waterways. The products of the farms are brought to market by means of the canals, and sold directly from the boats. (See Fig. 414.) In winter, when the canals are frozen, the people travel to market on skates. As the rivers are navigable, and as their valleys furnish natural highways into the interior, the Netherlands transships a large amount of goods from Germany to Atlantic ports.

Foreign Possessions. The foreign possessions of the Netherlands are very important, because they lie in the tropics and furnish tropical products of great value to the people of northern Europe. They include *Java* and other islands in the East Indies, and *Dutch Guiana* in South America. Denmark owns three small islands in the West Indies and the large islands of *Greenland* and *Iceland*; the latter is valuable because of its fisheries. Belgium has the rich colony of *Congo* in Africa, and hence Belgium has important trade in goods from tropical central Africa.

Climate. Belgium, the Netherlands, and Denmark all lie in the belt of the westerly winds throughout the year. Hence the climate is even and damp, though increasing in intensity to the northward. Owing to the nearness of the sea, the winds bring abundant moisture to the region. As a result more than one-half of the days in Belgium are cloudy, and it rains in the Netherlands on an average of 204 days in the year.

The winds are not impeded by any irregularities of the surface and can therefore be depended upon to blow with sufficient intensity and regularity to turn windmills. This accounts for their general use.

In Denmark the climate is very much like that of eastern Scotland, but the winters are not sufficiently severe to close the harbors with ice for any length of time, though drifting ice is common for many months. The dampness here favors the formation of peat.

Products of the Soil. Owing to the fertile soil and moist, even climate Denmark and the Netherlands are primarily agricultural countries. Denmark, in its more rugged districts, is devoted to grazing, and has more cattle in proportion to its size than any other country of Europe. The dairying is conducted very carefully, and Danish butter is so good that it is carried to all parts of the world. The chief crops of Denmark are oats and sugar beets.

FIG. 416. *Peddling milk in dog-carts in Belgium. The inspector is making a note.*

In Belgium, cereals, flax, hemp, and sugar beets form the principal soil products. Sheep are raised in the drier southeastern portion. The country is also noted for its poultry and its horses.

In the Netherlands the best soil is near the sea and in the southern part of the country. Grazing and the raising of rye, oats, potatoes, and sugar beets are important. The Netherlands is also famous for butter and cheese.

Minerals. Few of the minerals are important. The Netherlands produces peat and pottery clay; the most important deposit of this clay is found about *Delft*, which gives its name to a certain kind of fine china. Coal and iron are found in Belgium in the hilly country; these deposits are a continuation of those found in France.

Fishing. Fishing in the Netherlands is important, especially that carried on in the North Sea and about Iceland. The principal fish is the herring, which is packed for export. Oysters are also found in abundance.

Manufacturing. In the Netherlands and in Denmark there is little coal and iron, and manufacturing is therefore relatively unimportant. Few goods are produced except for local use. Belgium, however, is a very important manufacturing country. Practically one million of its people are engaged in manufacturing, the preëminence of which is, of course, due to the mineral wealth of coal and iron.

Brussels (see Fig. 417), the largest town, is noted for its lace and carpets. *Liège*, another manufacturing city, is known especially for its iron and steel goods, firearms, machinery, and tools. Woolen and cotton manufacturing are also important. *Ghent* is especially noted for its linens.

FIG. 417. *A street in Brussels.*

Trade. The trade of Belgium, the Netherlands (see Fig. 419), and Denmark is large. Canals and railroads cover Belgium, and the Meuse is navigable to the German boundary; hence interior trade is easily carried on.

The trade of Belgium centers largely at *Antwerp* (see Fig. 420), which receives and again exports the larger part of the world's ivory. Belgium is a forwarding country for Germany and for goods from the United States destined for central

Europe. The chief exports are iron and steel, coal, guns, flax, and glassware; the imports are cereals, wool, lumber, and petroleum. (See Fig. 376.) Grain and petroleum are imported from the United States, but the exports to our country are few and unimportant.

In the Netherlands the chief trade is in exports to its colonies and in goods brought from these colonies and again exported. These include coffee, spices, gums, indigo, dyewoods, diamonds, leaf tobacco, and other goods of a similar nature. Butter, meat, and cheese are sent to England and Germany; cotton goods are sent to the colonies. From the United States the Netherlands secures cereals, tobacco, and meat products, which make about one-tenth of the imports of the country.

In Denmark, *Copenhagen* is the great distributing port for the Baltic countries (see Fig. 418), and the larger part of its trade is with them. Coal, textiles, food products, and machinery are leading imports; butter, eggs, and meat the exports of importance.

FIG. 418 *Copenhagen, the great distributing center of Denmark.*

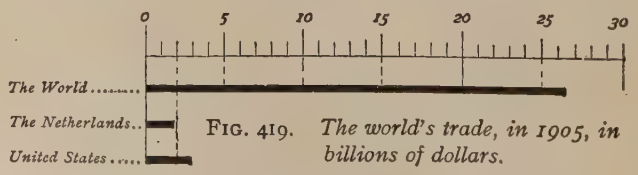

FIG. 419. *The world's trade, in 1905, in billions of dollars.*

People. The people of Belgium (see Fig. 416), the Netherlands, and Denmark are all very interesting because of their general thrift and industry, as well as for their customs.

The Danes have always been successful as mariners and explorers. They have a high standard of education. The greater part of the population are rural people, living simple lives, devoted to their homes and country.

The people of the Netherlands are of many stocks, but they are united by a common written language, called *Dutch*, which is the common spoken language among the cultured classes. In many of the rural districts dialects which have been inherited for generations are spoken. The people as a rule dress in full, loose clothes and wear wooden shoes; this may be considered the national costume. The Dutch have been important colonizers; they were among the first to establish their settlements in our own country. Many of the local names about New York City and in the Hudson River Valley are witnesses to the former occupation by the Dutch.

The Belgians are more advanced in the arts and sciences than either the Danes or the Dutch. They show the influence of their neighbors, however, in the persistence

FIG. 420. *Antwerp, the great ivory market of the world.*

of two national languages, *French* in the southern provinces, and *Flemish*, which is closely akin to Dutch, in the provinces bordering the Netherlands.

Scenery. The color conditions due to the climate and the vegetation make these countries, and especially the Netherlands, a favorite resort for artists. The quaint rural people with their characteristic costumes, their large flowing clothes and wooden shoes, are also a great attraction.

Belgium, being a buffer state between several great nations, is of much interest historically. It has been the scene of many great battles, some of which, like that of Waterloo, where Napoleon was defeated in 1815, are famous the world over.

Questions and Exercises

(1) What does a study of the map tell you of the disadvantages to commerce of the coast line of Belgium? (2) What is its chief ocean port, and what are its principal advantages and disadvantages? (3) How has the inland city of Amsterdam been made an ocean port? (4) Examine the position of Belgium between France and England on one side and central Europe on the other. What natural advantages has it for doing a transit trade? (5) Why has it been a great battlefield in modern times?

(6) What disadvantages does Belgium suffer with regard to her two rivers? (7) Make a chart of the products of Belgium, the Netherlands, and Denmark according to the following directions: In one column write the names of the products; in another the countries where they are found; in a third some facts you have learned about the importance of these products; in a fourth the cities engaged in manufacturing or exporting these products.

(8) Compare Copenhagen and Gibraltar in position; in importance. (9) Why is the Baltic Sea not so important as the Mediterranean?

LVI. NORWAY AND SWEDEN

Size and Extent. The peninsula of Scandinavia includes the two countries, *Norway* and *Sweden*. Norway is a little larger than New Mexico, and Sweden is somewhat larger than California.

The peninsula extends far beyond the Arctic Circle and over more degrees of latitude than any other division of Europe except Russia. It is swept by the westerly winds, which bring to it the warmth and the moisture they have taken up in passing over the North Atlantic Drift. For this reason it has a mild, damp climate on the western side, where the average temperature is much higher than is usually found in a country so far from the equator. (See Fig. 74.)

Coast Line. The coast line of Norway is very irregular; it abounds in magnificent fiords, affording fine harbors far famed for their scenery. (See Figs. 55 and 421.) Off the coast are a great number of islands, forming a kind of barrier which protects coasting vessels in their voyages along the inside channel. These islands are surrounded by

FIG. 421. *A Norwegian fiord.*

RUSSIA
NORWAY SWEDEN
AND DENMARK
SCALE
0 100 200 300
311 Miles to one inch
Capitals of Countries ★ Other Cities •
Relative importance of places shown by size of type
Longitude East from Greenwich
Latitude North
ARCTIC OCEAN
KARA SEA
BARENTS SEA
WHITE SEA
BALTIC SEA
BLACK SEA
CASPIAN SEA
GULF OF BOTHNIA
GULF OF FINLAND
SEA OF AZOV
LAPLAND
KOLA PENINSULA
TUNDRA
SIBERIA
Moscow
St. Petersburg
Stockholm
Christiania
Copenhagen
Warsaw
Berlin
Hamburg
Leipzig
Vienna
Prague
Lemberg
Cracow
Königsberg
Riga
Reval
Helsingfors
Abo
Archangel
Vologda
Nijni Novgorod
Kazan
Perm
Ekaterinburg
Tobolsk
Samara
Orenburg
Astrakhan
Saratov
Tsaritsyn
Rostov-on-Don
Ekaterinoslav
Kharkov
Kiev
Odessa
Sebastopol
Simferopol
Crimea
Caucasus Mts.
Caucasus
Kazan
Ural Mts.
Ural River
Volga R.
Dnieper R.
Don R.
Vistula R.
Danube R.
Aral Sea
Lake Ladoga
Lake Onega
Gulf of Riga
Gulf of Finland
Gulf of Bothnia
Sea of Azov
Caspian Sea
Black Sea
Baltic Sea
North Sea
Arctic Ocean
Kara Sea
Barents Sea
White Sea
Bukarest
Debreczen
Danzig
Stettin
Posen
Breslau
Frankfurt
Dresden
Hanover
Bremen
Kiel
Copenhagen
Christiania
Stockholm
Gothenburg
Malmö
Helsingfors
Abo
Reval
Riga
Libau
Memel
Königsberg
Danzig
Stettin
Posen
Breslau
Frankfurt
Dresden
Hanover
Bremen
Kiel
Hamburg
Berlin
Leipzig
Vienna
Prague
Lemberg
Cracow
Warsaw
Lodz
Kalisz
Radom
Lublin
Lutsk
Rovno
Vilna
Grodno
Bialystok
Minsk
Pinsk
Brest Litovsk
Bobruisk
Borisov
Smolensk
Moghilev-on-Dnieper
Vitebsk
Polotsk
Dvinsk
Velikiya Luki
Pskov
Yuriev
Dünamünde
Ostrov
Staraya Russa
Valdai
Plateau
Ostashkov
Torzhok
Tver
Vyshniy Volochok
Rybinsk
Yaroslavl
Kostroma
Ivanovo-Voznesensk
Vladimir
Rzhev
Volokolamsk
Serpukhov
Kaluga
Tula
Bolkhov
Orel
Kursk
Gomel
Chernigov
Staryi Oskol
Byelopolie
Sumy
Nyezhin
Priluki
Lubny
Akhtyrka
Byelgorod
Ostrogozhsk
Kozlov
Tambov
Morshansk
Penza
Kuznetsk
Saransk
Simbirsk
Sergievsk
Syzran
Samara
Buguruslan
Buzuluk
Orenburg
Orsk
Troitsk
Chelyabinsk
Zlatoust
Ufa
Bugulma
Sterlitamak
Chistopol
Kasimov
Arzamas
Murom
Nizhniy Novgorod
Kazan
Vetluga
Urzhum
Malmyzh
Sarapul
Votkinsk
Glazov
Okhansk
Kungur
Kologriv
Vyatka
Nikolaievsk
Petrovsk
Volsk
Novouzensk
Kamyshin
Dubovka
Tsaritsyn
Lugansk
Starobyelsk
Borisoglyebsk
Novocherkassk
Taganrog
Mariupol
Berdyansk
Yelsk
Ekaterinodar
Stavropol
Mozdok
Petrovsk
Kerch
Theodosia
Yalta
Sevastopol
Simferopol
Perekop
Kherson
Nikolaiev
Berislav
Tiraspol
Bendery
Kishinev
Yassy
Galatz
Ismail
Akkerman
Odessa
Belta
Elisabethgrad
Kremenchug
Poltava
Cherkassy
Berdichev
Zhitomir
Kiev
Vinnitsa
Kamenetz-Podolsk
Debreczen

shoals which abound in fish. Because of these favoring conditions the inhabitants of Norway have long been a seafaring people. The eastern coast contains many harbors, but the climate here is more severe, and many of the harbors are ice-locked for several months in the year, some of them even for six months.

FIG. 423. *A mountain on the coast of Norway, which has been much worn away by the waves.*

Surface and Drainage. Norway occupies the short, steep, western slope of the Kjölen Mountains, and with the exception of Spain it is the most distinctly mountainous country in Europe. Sweden lies to the east, and is for the most part a level plain which has been heavily glaciated and is dotted with numerous lakes. The larger lakes are connected with each other and with the sea by canals, so that transportation is made easy.

More than one-half of Sweden and one-fourth of Norway is covered by forests. The highest mountains in the north and northwest of Norway abound in great glaciers, which, with the fiords and waterfalls, give the country much strikingly beautiful scenery. (See Fig. 423.)

Climate. There is a great difference between the climate of Norway and Sweden, because Sweden is shut off from the mild westerly winds of the Atlantic by the north and south highland. The *Lofoten Islands* have an average winter temperature no lower than that of New York City, while the average temperature in eastern Sweden in winter is twenty degrees colder. The higher valleys of Norway have a severe and uncomfortable climate, and in consequence are little occupied, but the climate of the lower valleys and the seacoast is tempered by the ocean breezes.

The warm winds of the Atlantic give up much of their moisture on the western coast, where, in places, the rainfall is as great as seventy-nine inches a year; it decreases to the east, in some places amounting to only thirteen inches. There is a great abundance of snow in Sweden, and hence the use of a peculiar kind of snowshoes known as *skis* is very common. Sweden has a summer temperature, however, that is favorable for hardy grains. (See Figs. 82 and 84.)

Products of the Soil. Except in eastern Sweden, the amount of land in the peninsula suitable for farming is very limited, and as a result only a small portion of the people are engaged in agriculture. The vast forests make Norway and Sweden the most important timber-producing countries in Europe. On the higher slopes, which are not timbered, the abundance of moisture brings forth an excellent supply of grass, which furnishes food for large numbers of cattle and sheep.

FIG. 424. *Norwegian peasant women.*

Mining. In both Norway and Sweden mining products are important, but owing to the great purity of Swedish iron, mining is better developed in that country. Copper, silver, and zinc are also obtained in Sweden, but there is very little coal. Silver, gold, and copper are mined in Norway.

Fishing. Owing to the poor agricultural opportunities in Norway, the people naturally

turned to the sea for their food. Therefore the fishing industry, which is favored by the splendid harbors and the proximity of the Atlantic fishing grounds, is the leading industry in Norway. The principal center is about the Lofoten Islands, where sometimes more than 40,000 men are engaged. Cod, herring, anchovies, mackerel, and salmon are the most important fish.

Manufacturing. Owing largely to the abundance of water power furnished by the short streams from the mountains, manufacturing is increasing rapidly. Timber products, including wood pulp and matches, are the chief manufactures. Swedish matches are exported to all parts of the world. The fishing industry makes fish curing and shipbuilding noteworthy occupations in Norway. The manufacture of iron and steel and of woolens and cotton goods is increasing.

FIG. 425. *The city of Stockholm, Sweden.*

Trade. Sweden is the largest lumber and timber exporting country in the world, and these products form about one-half of the total exports. They are sent principally to the other countries of Europe where timber is scarce. Owing to the excellent harbor facilities of Norway, this country has long been important for its oceanic commerce. In Sweden the numerous railroads and canals make transportation of goods from the interior cheap and easy. The chief imports are breadstuffs and woolen manufactures. The trade of the countries with the United States is unimportant. (See Fig. 426.)

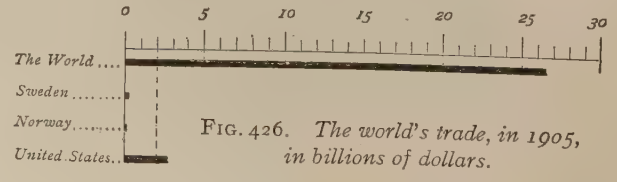

FIG. 426. *The world's trade, in 1905, in billions of dollars.*

Stockholm, built on a number of islands connected by bridges, is the chief importing city (see Fig. 425), but is excelled in exports by *Gothenburg*. Gothenburg, from its position near the North Sea, has an active trade with the countries of continental Europe.

Other cities of commercial importance are *Christiania*, built at the end of a long and fine harbor; *Bergen* (see Fig. 427), the center of the fish trade, and *Trondhjem*, the third town in size. All the large towns of both countries are near the sea, and in Norway the larger number of people live close to the shore.

People. The people of Norway and Sweden were for very nearly a century united under one government. In October, 1905, however, Norway withdrew from the union and formed a separate kingdom with a king at the head of the government.

The people are exceedingly industrious, and in spite of the many adverse conditions they gain a livelihood by their simple rural occupations. (See Fig. 424.) The educated men, however, have always been leaders in science and literature, and some of the Norse legends and traditions of past ages as recorded by the early writers rank among the great and enduring masterpieces in literature.

Scenery. Norway is visited each summer by large numbers of people who are attracted by its magnificent scenery. There are many wonderful glaciers and waterfalls, and the fiords are of great interest and beauty.

The more northern towns like *Hammerfest* and *Tromsö* are much visited by people who want to see the *midnight sun.* (See Fig. 428.) These towns are so far north that during a part of the summer the sun can be seen both night and day. Of course in winter there is an equal length of time when the sun does not rise at all.

Questions and Exercises

(1) Draw a sketch map of Norway and Sweden. Draw the parallels of 55 and 70 degrees north latitude. Through how many degrees do these countries extend? (2) What difference in temperature between the south and north might you expect? Find out from the temperature map of the world whether this difference exists. Reason for this? (3) What portion of North America has a similar range of temperature? For what reason? (4) What is the difference in temperature between the western and eastern coasts? In rainfall? (5) What causes this difference? (6) Color the map drawn in Exercise 1 in shades to show the rainfall of Norway and Sweden. (7) Draw the January isotherm of 30° with one color, the July isotherm of 60° with another. What can you say of the western slope of Norway as compared with the eastern slope of Sweden? (9) What is the character of the rivers of Norway? (10) How has the character of the coast affected the occupations of her people? Illustrate this.

(11) Draw a diagram which will explain the fact of the *midnight sun.* (12) Tell how life in Sweden in winter and summer would be different from your own.

(13) Give one reason why so many matches are made in Sweden. (14) Why should cheese be an important food of the people? (15) Name three countries of Europe which have an extensive fishing trade. (16) What are the climatic and surface conditions which favor the growth of forests? (17) Of what use are the Swedish rivers in the lumbering industry?

(18) Compare the locations of Stockholm and Venice. (19) Consult the temperature map and find out if the harbor of Stockholm would be closed by ice during the winter. (20) On the map used above locate the chief towns.

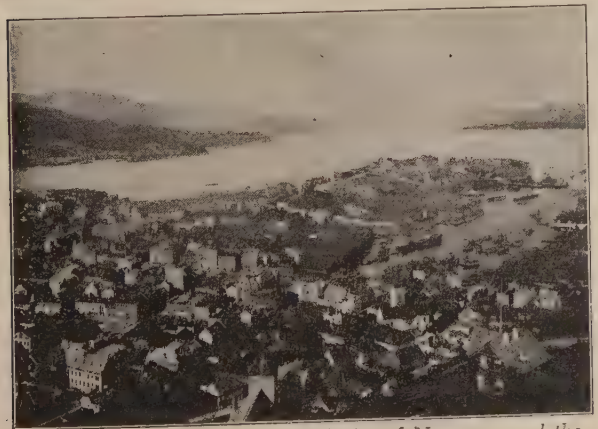

FIG. 427. *Bergen, the second city of Norway, and the center of the fishing industry*

FIG. 428. *The midnight sun at Hammerfest.*

LVII. RUSSIA

Size. Russia is the largest country of Europe. It occupies more than one-half the continent and is about two-thirds the size of the United States, not including Alaska and the other detached dependencies. It extends far beyond the Arctic Circle, and is really the western part of the great plain which occupies Siberia. The Russian Empire, which includes *Siberia*, *Turkistan*, and *Caucasia*, occupies one-sixth of the land surface of the globe.

Coast Line and Boundaries. Although Russia is bordered by the ocean or large seas in the north, west, and south, it has few good harbors for the reason that a large part of its coast is ice-bound during several months of the year. As Germany controls the entrance to the Baltic, and Turkey that to the Black Sea, these seas are of little commercial value to Russia. Russia has now

secured an outlet to the Pacific Ocean at Vladivostok in Asia, on the sea of Japan, at the end of the long Trans-Siberian Railroad.

Russia is bordered on the northeast by the Ural Mountains, which attain mountain dignity only in places. At the point where the great Trans-Siberian Railroad, which connects St. Petersburg and Vladivostok, crosses the Urals, no one would know from the outlook that a mountain range existed.

FIG. 429. *Looking down the broad valley of the river Volga.*

Surface. The only elevation of any note in the great plain of Russia is the Valdai Plateau, which rises to a height of 1,100 feet and acts as the center from which the drainage of the region radiates. Many long rivers flow down the gentle slopes toward the edge of the country, and are therefore of great commercial importance when not ice-bound. (See Fig. 369.) The largest river, the *Volga*, is frozen for three months in the year. (See Fig. 429.) Many lakes dot the surface of northwestern Russia, especially in Finland. *Lake Ladoga*, nearly as large as Lake Ontario, is the largest lake of Europe.

In southeastern Russia there is a large area which is below sea-level. This region borders the Caspian Sea, whose surface is eighty-six feet below the Mediterranean. Many of the lakes of this section therefore have no outlet and consequently are salt or brackish.

FIG. 430. *A Lapland camp.*

Climate. Russia lies in the eastern section of Europe, far from the tempering influence of any ocean, and is therefore characterized by extremely cold winters and short, hot summers.

The growing season is short and follows quickly after a late spring. Approximately one-half the area has a rainfall of less than twenty inches a year, but as this comes largely during the growing season, agriculture can be carried on successfully in the central and southern portions.

Products of the Soil. In the north is the *tundra* area, mainly of use for pasturing reindeer. Here the *Lapps* (see Fig. 430) and *Samoyedes* live a nomadic life, depending largely upon the chase for their support.

Extending south as far as a line running southeast from St. Petersburg is the great forest region, composed largely of evergreen trees from which resin and timber are secured. This is also the great fur-producing area of the country.

Central Russia is an agricultural and industrial region, and the richest part of the country. This agricultural area includes the famous *black earth* region, an area of land of unsurpassed fertility which extends south to the parallel of 50 degrees north latitude. The rich, dark soil of this treeless region is well adapted to the

growth of cereals, especially wheat and barley (see Figs. 431 and 432), which require abundant sunshine. Yet, owing to the general ignorance of the people and to the use of poor machinery, agriculture does not thrive as it should. However, the use of modern agricultural tools imported from the United States is increasing and agriculture is improving.

South and southeast are the arid *steppes*, great plains covered with grass, but too dry for agriculture. Here is a nomadic people who raise great numbers of cattle, horses, and camels.

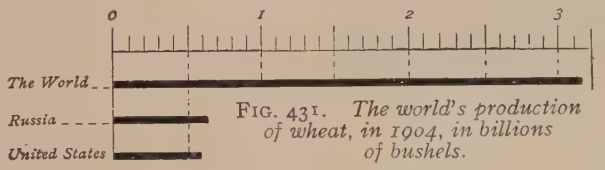

FIG. 431. *The world's production of wheat, in 1904, in billions of bushels.*

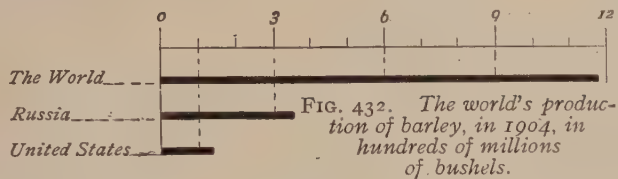

FIG. 432. *The world's production of barley, in 1904, in hundreds of millions of bushels.*

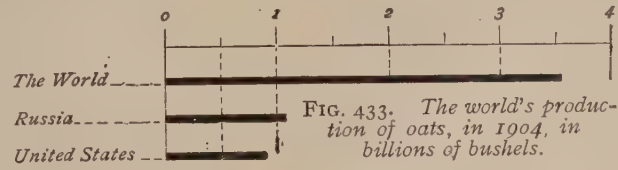

FIG. 433. *The world's production of oats, in 1904, in billions of bushels.*

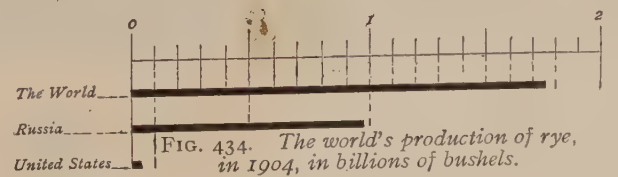

FIG. 434. *The world's production of rye, in 1904, in billions of bushels.*

Russia competes with the United States in production of wheat (see Fig. 431), raises more flax and hemp than any other country of the world, and produces nearly one-half of the oats grown in Europe. (See Fig. 433.) It excels all European countries in production of barley, surpasses all countries in rye (see Figs. 432 and 434), and ranks fourth in sugar. The rye is used largely at home, as the people live chiefly upon black bread.

Russia leads the continent in cattle and sheep, raises one-half the horses of Europe, and is second to Germany in hog raising.

Mineral Products. Russia has an abundance of coal and iron, worked chiefly in southern Russia and Poland, and large deposits of gold. The most valuable mineral product is platinum, which comes from the eastern slope of the Urals. In fact, this region produces the larger part of all the platinum used in the world.

Manufacturing. Russia at the present time is producing nearly enough manufactured products for its own use. But owing to the backward condition of the country and to the fact that the mineral deposits are not so well developed as in the United States, the United Kingdom, and Germany, manufacturing has developed slowly. Most of the manufacturing is done in small shops or in the homes of the people. The chief products are textiles, leather goods, wood and metal goods, and pottery. Cotton manufacturing is especially important. Russia is surpassed only by the United States and the United Kingdom in the manufacturing of cotton. The raw material is largely imported from the United States.

Moscow, with coal and timber near at hand, leads in manufactures and is the chief railroad center. Its principal industries are wool and silk weaving. (See Fig. 435.) *Warsaw* on the Vistula has steam navigation on that river and is the second inland city in industry and trade. Textiles are produced at *St. Petersburg* and in *Poland*. *Odessa* has important flour mills, sugar refineries, and breweries. (See Fig. 437.)

Travel. There are few railroads in Russia, and the larger portion of the trade of the country is carried on by water. In winter when the rivers and canals are frozen most of the transportation is by means of sledges. The building of the Trans-Siberian Railroad has been of great importance to Russia, for

FIG. 435. *Moscow, showing the Kremlin on the left.*

along its route agriculture and manufacturing have been stimulated and will doubtless grow in value yearly. It is now possible to go from St. Petersburg, the capital of the empire (see Fig. 436), to the Pacific coast in a little over two weeks with comfort and ease. The road is, however, poorly built and the trains cannot attain the speed that is common in transcontinental traveling in North America.

FIG. 436. *St. Petersburg, the capital of Russia.*

Commerce. The chief exports of Russia are cereals and flour, timber, eggs, dairy products, and flax. Russia sends large quantities of wheat to the United Kingdom, and imports machinery from that country and Germany. To the United States are sent leather, flax, and flax-seed. (See Fig. 439.)

The Black Sea ports, of which *Odessa* and *Sebastopol* are the most important (see Figs. 437 and 438), are mainly devoted to the shipment of agricultural products sent to Asia and southern Europe. *St. Petersburg*, owing to its position, is the greatest trade center in the north; it exports grain and lumber. *Riga* exports rye, oats, and lumber. The trade of *Astrakhan* is chiefly in sturgeon and other fish secured from the Volga.

Fairs. Before the development of canals and railways in recent years, the largest part of the trade of Russia was carried on at great annual fairs which were held at *Nizhniy-Novgorod* and *Kharkov*. Although these fairs have declined somewhat in importance, they are still the scenes of active trading in goods from all parts of the world. People attend by thousands from all parts of the empire and many million dollars' worth of trade results each year.

People. The people of Russia differ in many ways from those of any other nation of Europe. They belong for the most part to a somewhat different branch of the white race, though they include many Swedes, Finns, and Jews among their numbers.

Owing to the poor development of education and to the form of government, the Russians as a whole are not progressive. The Czar is the head of the government and allows the people but little voice in the government. The people are also

FIG. 437. *The port of Odessa.*

very heavily taxed for the maintenance of the government and the large standing army, and therefore have little accumulated wealth.

Throughout a large part of Russia the people own their lands in groups, each member of a group having a certain amount of field and pasture land, so that he can gain a livelihood for his family. He cannot give up the land and it is therefore difficult for him to change his occupation or his place of abode.

In fact the Government does all it can to keep the people from becoming in any way independent. This attitude of the leaders in Russia is altogether different from that of the leaders in the great nations like the United States, the United Kingdom, and Germany, and is the chief reason for the lack of the progress of the people of the nation as a whole.

FIG. 438. *Sebastopol, one of Russia's ports on the Black Sea.*

Questions and Exercises

(1) Make a list of the Russian ports that are icebound during a part of the year. (2) Why did Russia build the Trans-Siberian Railroad? (3) What towns does this railroad connect?

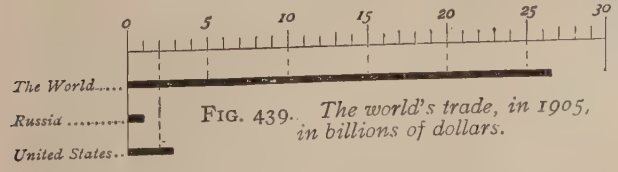

FIG. 439. *The world's trade, in 1905, in billions of dollars.*

(4) Draw a diagram showing how the Valdai Plateau is the center from which the rivers of Russia flow. (5) Draw a portion of the coast at the mouth of each river of Russia and locate the parallel which passes through Astrakhan and Archangel. (6) Why should the Don be free from ice when the Volga is blocked for three months of the year? (7) Account for the number of lakes in Finland and compare with a portion of the United States for similarity of surface and cause. (8) Why are so many lakes in the south of Russia brackish? (9) What region in the United States has brackish lakes for a similar reason?

(10) On an outline map color the different vegetation regions of Russia. (11) On this map write the average rainfall of these regions and their January and July temperatures. (12) Write the chief products of the *black earth* and the *steppe* regions and underline those products which are raised in great quantities.

(13) How does Russia rank in the production of wheat? (14) Through what port does the wheat of Russia pass to the East?

(15) What are the disadvantages of the location of St. Petersburg as a capital? (16) Draw the main railroads diverging from Moscow. (17) Trace the route of the Siberian Railroad in Russia and name the towns on the road. (18) Tell how you would go from Berlin to Baku; from Moscow to Paris. (19) Why is Helsingfors a good place for an astronomical observatory? (20) Explain the difference between the January temperatures of Archangel and Reikjavik.

LVIII. THE GERMAN EMPIRE

Size and Boundaries. The German Empire, or Germany, is the most central country of Europe. It is as large as the New England States, New York, New Jersey, Pennsylvania, and Ohio. Besides the home country the empire also includes large possessions in Africa, *German New Guinea*, and certain small islands in the Pacific. (See Fig. 382.)

FIG. 440. *On the water front at Hamburg.*

Only one-third of the boundary line of Germany is seacoast. This necessitates the maintenance of a large army for defensive purposes. The northern frontier is on a lowland difficult of defense but favorable for trade. The rest of the land boundary is in mountainous regions which are easily defended.

Germany may be divided into North and South Germany. The former controls the maritime trade and the latter the commerce with the neighboring countries, which is carried on along the Danube and over the Alps. The coast is largely bordered by shallow waters and therefore does not afford so many harbors as we should expect from its length and indentations. The Baltic Sea has many lagoons known as *Haffe* which are used as harbors.

FIG 441. *Looking down the Upper Rhine Valley.*

Hamburg, the greatest seaport on the continent of Europe and the third port in importance in the world (see Fig. 440), owes its supremacy to its location on the most southeasterly inlet on the North Sea, and on the lower Elbe, which, next to the Rhine, is the chief waterway of Germany. *Bremen*, which is nearest the Atlantic, is a close rival, but is less favorably situated because the Weser River offers less extensive water connections with the interior.

Surface. North Germany is a part of the great lowland of northern Europe, while the southern part is a highland culminating in the Alps. The northern plain, which is nowhere over 600 feet in height, is covered with sands and clays brought by the great ice sheet, and abounds in small glacial lakes.

The southern plateau is from 1,000 to 2,000 feet in altitude. (See Fig. 451.) In the extreme south where it joins the Alps it becomes higher, but at no point is it 10,000 feet above the sea level. The higher lands of Germany include a portion of the Danube basin, a rolling surface with an elevation of about 1,600 feet which is covered with glacial deposits.

Drainage. The rivers of Germany all flow to the north except the *Danube*, which is the most important commercial river of eastern Europe. The chief rivers of North Germany are the *Elbe* and the *Rhine*. (See Fig. 442.) The Rhine is navigable to Mannheim and is connected by canals with the Rhone, the Seine, and the Danube. Canals also connect Berlin with the Elbe, and the Elbe with Kiel. The Kiel canal is of great importance to shipping because it has shortened by many

FIG. 442

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miles the trade routes between the Baltic ports and the Atlantic Ocean. Other canals follow the valleys of the rivers which are too small for navigation. (See Fig. 376.)

Climate. Germany lies entirely within the westerly wind area. Therefore the western portion has a climate which is somewhat tempered by the ocean. Toward the east the winter climate becomes colder because the continental conditions there more than counteract the influence of the ocean. The temperature of southern Germany is no higher on the average than it is in northern Germany, because the advantage of a more southern position is compensated for by the increase in altitude. The low-lying protected plains of the Rhine, Moselle, and Main have hot summers and mild winters.

FIG. 443. *Farms and pastures in the forest region of Germany.*

The westerly winds give up their moisture as they blow over the land, so that the rainfall decreases from about forty inches in the western part of Germany to about twenty inches in the east. The headwaters of the north-flowing rivers of the east, like the Vistula, thaw out in the spring before the lower regions are free from ice, and great and damaging floods often result.

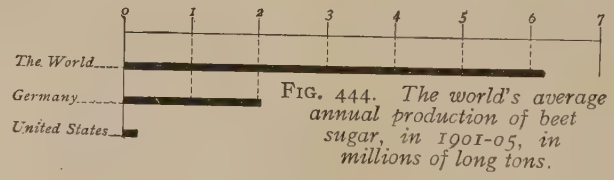

FIG. 444. *The world's average annual production of beet sugar, in 1901-05, in millions of long tons.*

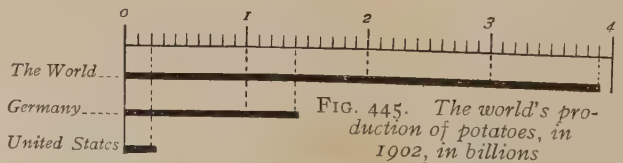

FIG. 445. *The world's production of potatoes, in 1902, in billions of bushels.*

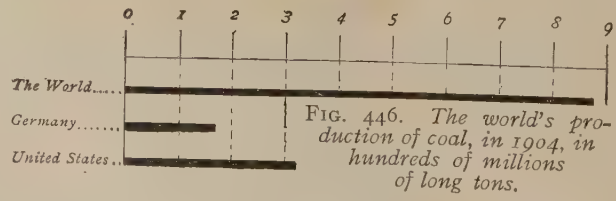

FIG. 446. *The world's production of coal, in 1904, in hundreds of millions of long tons.*

Products of the Soil. About one-half of the area of Germany is cultivated, one-fourth is in forest, and the rest is mostly used as pasturage. (See Figs. 119 and 443.) As a result the agricultural products are very important.

Sugar beets, raised largely throughout central Germany, are the chief crop, and Germany produces about one-third of all the beet sugar of the world. (See Figs. 444 and 576.)

In the northern plain are vast fields of potatoes, in which crop Germany also leads the world. (See Fig. 445.) The infertile soil and the absence of opportunity for manufacturing make this a thinly populated region except in the Oder and the Vistula valleys. Where the soil is sufficiently fertile, cereals are grown. Rye is raised extensively, but is mostly used at home in the making of black bread.

The best soil and the most favorable climate for agriculture are found along the Rhine, where grapes and tobacco are the chief crops. Grapes are also raised in certain favored points in the valley of the Oder, the most northerly limit of vine culture in the world. The other noteworthy crop of Germany is hops, which are raised more especially in the higher areas of the southeast. The larger part of this crop is used in the extensive breweries of Munich.

In the hilly districts of central Germany are forests of beech, fir, spruce, pine, and

oak, from which are secured wood for the famous toy factories of Nuremberg.

Stock Raising. Germany is second to Russia among the European countries in the raising of cattle. The breeding of horses and cattle is carried on extensively in the damper plains of the north, while sheep are raised in the drier eastern section. Hogs are kept in large numbers on the farms in the sugar-beet area, where they live on the refuse from the sugar factories. Large numbers are also raised in the hilly district of central Germany, where they feed on the nuts in the forests.

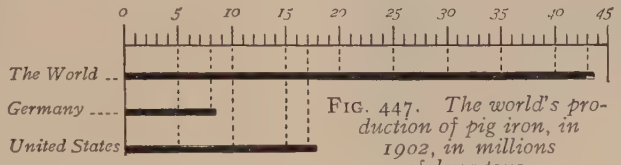

FIG. 447. *The world's production of pig iron, in 1902, in millions of long tons.*

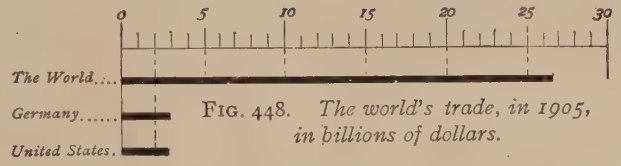

FIG. 448. *The world's trade, in 1905, in billions of dollars.*

Mining. Germany is rich in coal (see Figs. 446 and 590) and iron and is second to the United Kingdom among European countries in the output of these minerals. It also has extensive mines of silver, copper, and salt, and yields the larger part of the world's zinc. Copper is found in the Erzgebirge and the mountains of the central part. Germany furnishes the best lithographic stone used in engraving.

FIG. 449. *The museum and the public square of Berlin.*

The particular advantage of Germany in minerals is that the coal and the iron are found near together and close to navigation, especially in the valleys of the Rhine, the Elbe, and the Oder. The iron is worked only where it is near coal, and on these two depends Germany's great advance in manufacturing.

Manufacturing. For the reasons given above Germany is distinctly a manufacturing country. It ranks next after the United States and the United Kingdom in the value of its products. Iron (see Figs. 447 and 591) and steel manufacturing are the chief forms, especially about *Essen* and *Dortmund* in the region known as the valley of the Ruhr.

The development of the steel industry is one of the chief reasons for the movement of the population of Germany from the country regions to the cities. *Essen*, the chief steel-making city, has the largest steel mills in the world. All the larger towns in the Ruhr Valley, however, are famous for their steel products, especially for cutlery, machinery, needles, and firearms.

Germany, with its irregular coast line, good harbors, and excellent supply of iron and steel, could not fail to become a great shipbuilding country. It is surpassed only by the United Kingdom. The largest part of this industry is carried on at the great ports of *Stettin*, *Hamburg*, *Danzig*, and *Kiel*.

Cotton manufacturing is extensive in many parts of Germany, especially at *Cologne*, *Elberfeld*, and *Chemnitz*. Woolen manufactures are well developed in the eastern portion near the supply of wool. The largest part of the cotton used in manufacturing is brought from the United States and distributed to the several cities by boats up the Rhine.

Commerce. Germany has a very large amount of internal as well as of foreign

FIG. 450. *A street scene in Munich.*

commerce. (See Fig. 448.) It is the second of the countries of Europe in its commerce and carries on about one-eighth of the world's trade. The larger portion of its trade is with the United Kingdom, Russia, Austria-Hungary, and the United States. The United States furnishes over 12 per cent of its imports and receives about 10 per cent of its exports. The fine system of canals which has already been mentioned and the splendid network of railroads make internal commerce easy. Germany is second only to the United States in the number of miles of railroad. Its chief imports are cereals, wool, cotton, and metals; its exports include sugar, cotton and woolen manufactures, coal, iron goods, and machinery. Its cotton goods are sent to the warmer regions of Central and South America and its woolen goods to the colder part of South America.

Centers of Interior Trade. *Berlin* is the capital and the chief railroad and manufacturing center of Germany. Owing to its position on the northern plain and its ready water connections with the coast towns, it has become the chief interior city in trade. It is famous for its fine art galleries, its great university, and its beautiful streets. (See Fig. 449.) *Munich* (see Fig. 450), noted for its breweries, largely controls the commerce between North Germany and the Adriatic Sea. *Breslau* commands the trade with Austria-Hungary and southeastern Europe. *Leipzig* leads in printing books, is the seat of a great university and the world's chief fur market. *Cologne*, from its position between France and Germany, is a great railway center for trade with western Europe. It is also noted for its beautiful cathedral. *Danzig* exports the timber and wheat brought to it down the Vistula. *Dresden* exports quantities of metal goods, and *Magdeburg*, *Hanover*, and *Brunswick* have extensive sugar refineries and a large sugar trade. *Strassburg*, an active trade center, is noteworthy also as an important stronghold.

People. The agricultural people of Germany have acquired habits of thrift and perseverance because they have been compelled for generations to secure their living from a soil that is nowhere extremely fertile. In spite of such difficulties Germany has progressed very rapidly within the last three decades. The people have increased greatly in numbers, have improved their machinery and methods of agriculture, and have taken an important position in the commercial and industrial world. This progress is undoubtedly due in large part to the excellent system of compulsory education, and to the fact that many weak and independent states have been consolidated into a great empire. Science and learning have been fostered, improved machinery has been invented, and the people as a whole have become more highly educated than those of any other country.

FIG. 451. *A German town built on a small plateau.*

The Germans are naturally home-loving and quiet, painstaking and thorough; they are less impetuous than the French. These qualities the Germans have carried with them when they have emigrated to new countries, as they have in large numbers to the United States.

Scenery. Germany is one of the most interesting countries of Europe. Its great advance in industries, its very old and renowned educational institutions, and its many historic cities attract many visitors to it each year, not only from other countries of Europe, but also from the United States.

The valley of the Rhine is one of the most famous in the world for its beauty. The broad, winding river deeply set in its narrow, steep-sided valley, and with its slopes largely covered by vineyards and fields, makes a very picturesque and interesting route of travel. The many cities of historic interest along its banks also make this a favorite route for entering Germany. (See Figs. 441 and 452.)

FIG. 452. *The famous Rheinstein Castle on the Rhine.*

Questions and Exercises

(1) On the margin of an outline map of Central Europe write the name of a place in North America in the approximate latitude of Munich; of Hamburg. (2) Compare the latitude of Germany with that of the United States. (3) Does the sun set earlier at Berlin or at Quebec?

(4) Make a list of the countries which border Germany and mark with a star those which are separated by mountains. (5) On the map used in Exercise 1 write the names of these countries and the bordering mountain ranges. (6) Describe the coast which borders on the North Sea; on the Baltic Sea. (7) Where would you expect to find sand dunes? Dikes? Marshes? (8) Consult the temperature maps and tell whether the Baltic ports are free from ice during the winter. (9) Why is Hamburg a more important port than Bremen? (10) What canal, which has been recently constructed, has promoted the trade of the ports along the coast of the Baltic Sea? What effect may the opening of this canal have on the commerce of Hamburg?

(11) Fill out the following chart:

RIVERS OF GERMANY			
Names	*Source (Country)*	*Mouth (Country)*	*Chief Towns*

(12) On your outline map draw the rivers of Germany. (13) What large tributaries has the Rhine from the east? (14) What towns are situated at the junction of these rivers with the Rhine? (15) Find out what Rheinstein means. Why were castles built in such places? (16) Consult a map of Europe and tell about the importance of the Rhine as a great avenue of traffic for the continent.

(17) Make a list of the chief products of Germany; opposite each write the locality or region in which it is found, and mark with a star those products in which Germany stands foremost.

(18) On an outline map of Europe color the chief mineral regions of Germany and locate the manufacturing towns. (19) What towns have manufactures similar to those of Birmingham and Manchester? (20) What are some of the advantages of position by which Hamburg has attained the rank of one of the large ports of the world? (21) What important railroads cross at Berlin? (22) Trace the railroad between Paris, Berlin, and St. Petersburg, and name the large towns along its route. (23) What main roads converge at Munich? (24) Trace the railroad between Paris, Munich, and Vienna, and name the towns on this road. (25) What are the advantages of the position of Cologne? (26) What roads converge there? (27) Locate and give reasons for commercial growth of Mannheim, Breslau, Magdeburg, Dresden, and Leipzig. (Consult commercial and physical maps.) (28) Compare the industries of Germany and the United Kingdom; those of Germany and the United States. (29) What part of the United States has industries similar to those of the Ruhr Valley?

LIX. SWITZERLAND

Surface and Drainage. Switzerland is a small republic about twice the size of Massachusetts and lying in the very heart of Europe. It has no seacoast and more than one-half of it is occupied by mountains.

FIG. 453. *Lake Geneva.*

Between the Alps lying on the south and east and the Jura on the northwest there is a high valley, averaging about 1,300 feet in altitude, which forms the agricultural section of the country. (See Fig. 455.)

The rivers, because of the distribution of the mountains, flow outward in every direction. They are mostly too swift for navigation, but are largely used for floating timber. The several large and beautiful lakes, however, are important for internal commerce.

Climate. Owing to the altitude of Switzerland and to its position on the continent, it has a cool climate. Its rainfall is about as great as that of the eastern United States. Above the height of 8,500 feet there is eternal snow, so that the higher altitudes abound in glaciers and snow fields.

The rigorous winter climate is often modified by warm winds which blow over the mountains from the south. When there is a storm area over Germany the air is drawn in from all sides. That which comes from southern Europe loses a large part of its moisture as it rises to cross the Alps. Descending on the north side of the mountains and growing warmer as it descends, it becomes more and more able to take in moisture; it melts the snow and brings unusual warmth to Switzerland.

Products of the Soil. Agriculture is an important industry in Switzerland although the amount of land that can be devoted to that industry is small. The only agricultural product of value in trade is wine, which is made from grapes raised on the sunny slopes of the Jura and the Alps. (See Fig. 454.)

Grazing is very important; nearly three-fourths of the land not covered by forests, ice, or snow is devoted to this industry. (See Fig. 376.) The cattle and the goats are driven to the higher regions in summer and to the lowlands in winter. From the products of the herds cheese and condensed milk are made. The mountain villages also supply the towns in the plains with butter and cream.

Minerals. There is not much iron or coal to be found in Switzerland; salt and building stones are the chief rock products.

Manufacturing. In spite of the lack of fuel and iron, Switzerland is preëminently a manufacturing country. One-third of the people are engaged in this industry, particularly on the plateau and in the Jura. Owing to the position of Switzerland in the heart of the continent, it can easily trade with all its neighbors, and the magnificent power furnished by its perennial and swift streams

FIG. 454. *A vineyard on the slopes in Switzerland.*

affords excellent facilities for carrying on manufacturing. The water power here, as in Italy, is being utilized more and more in developing electricity for manufacturing. Watches and clocks are the leading manufactures. Swiss watches have long been noted for their excellence. Straw plaiting is carried on in the homes of the people.

Cotton and silks are the chief textiles. Silk is produced especially at *Zurich* and *Basel*, where the weaving is done mainly by hand. Cotton also is woven at Zurich and at *St. Gall*. Most of the raw material for

FIG. 455. *Peasant homes in a high valley among the Swiss Alps.*

this industry is secured from the United States. *Geneva* (see Fig. 456), is noted for its watches and clocks, though many of these are made in other towns and sold under the name of Geneva watches.

Trade. Owing to the roads that have crossed the mountain passes for centuries and to the modern railroads, some of which pierce the Alps in long tunnels, Switzerland has an excellent opportunity for trade with the north and with the ports on the Mediterranean. It has to import coal, gold for its jewelry, raw silk, and food stuffs. It secures cotton, wheat, and petroleum from the United States. The chief exports are silks, cottons, watches, machinery, cheese, condensed milk,

FIG. 456. *Approaching the city of Geneva.*

and embroideries. The principal part of the trade is with Germany, the United Kingdom, France, Asia, and Italy. The most important trade center is *Zurich*, which, from its situation, is the point of convergence of several railroads.

People. Each of the several states or *cantons* of Switzerland can almost be said to have a different type of inhabitant from any of the neighboring cantons. The mountainous character of the surface does not favor the ready intermingling of the people. Each valley is a more or less isolated region, and hence the inhabitants have little chance to exchange ideas with their neighbors. The mountain peoples are not so intelligent and educated as the people of the valleys. Thus there is no such uniformity of customs or similarity of ideas as is found in a nation upon a plain where people can readily mingle. In spite of these conditions, however, the Swiss have a strong love for their country, as is characteristic of almost all mountain peoples.

The Swiss are painstaking and deft in their handiwork, as is evidenced by their success in wood carving and jewelry work. The mountaineers are brave and daring and make excellent guides. In fact they are the best mountain climbers in the world, and their services are nearly always secured by those who desire to climb difficult peaks in other countries.

Scenery. Switzerland is noted the world over for its great glaciers, its magnificent mountains and lakes, and for the grandeur of its scenery. (See Figs. 453 and 457.) Therefore it is more visited by tourists than any other country in Europe. It is estimated that more than a million and a half of people visit this small country annually, and there are over 1,900 hotels primarily for the accommodation of these strangers. The receipts in money from the tourists are almost as great as the value of the watches and clocks which are sold. Hence the caring for tourists is one of the leading occupations of the people.

FIG. 457. *A glacier high up in the Alps. Notice the stream which flows from under the ice.*

Questions and Exercises

(1) Make a list of the countries and mountain ranges which border Switzerland. (2) Find the main divide from which many of the large rivers of Europe flow. (3) Draw a diagram of this with the outflowing rivers; make the diagram as complete as you can. (4) Name the rivers that flow through lakes. What effect has this on the sediment in the river? On the area of the lake? (See page 28.)

(5) What rivers flow from Switzerland? (6) Tell something you have seen or read about the character of these rivers. (7) Tell what you know about a glacier.

(8) Why is so much manufacturing done in Switzerland? (9) Why should the Swiss be such famous railroad builders? (10) Why are they so advanced in the use of electricity?

(11) On an outline map locate Zurich and draw routes by which the chief imports and exports come in and go out of Switzerland. (12) What railroads cross at Bern? (13) What town is on the border between Germany and Switzerland?

(14) Tell something of either Switzerland or its people that interests you. (15) Compare the scenery of Switzerland and Norway. (16) Why should there be hotels near the tops of the larger mountain passes? (17) Find out about avalanches.

LX. ITALY

Surface and Drainage. Italy is a long peninsula nearly as large as Georgia and Florida. The kingdom also includes the islands of *Sicily* and *Sardinia* and many small islands along the coast. The larger part of the country is occupied by the Apennines and the southern Alps. The Alps slope down abruptly to the great plain of *Lombardy*, which constitutes the larger portion of the lowlands of Italy. To the west of the Apennines from Genoa to Naples is a hilly country covered by materials thrown out by old and long extinct volcanoes and by detritus brought down by the rivers.

FIG. 458. *Looking across the broad, fertile coast plains from Pisa.*

All the good land is in the plain of

Lombardy or close to the coast (see Figs. 369 and 458), so that nearly one-fourth of the people live within three miles of the sea. In the Alpine region there are many large and beautiful lakes, which act as reservoirs for holding back the water that comes from the snow and rains of the mountains.

Owing to the abrupt slopes there are few long rivers in Italy. The longest of these is the *Po*, which, with its tributaries, is navigable for about six hundred miles.

FIG. 459. *The crater of Mount Vesuvius.*

In the south of Italy and on the island of Sicily are two of the most famous volcanoes of the world, *Mount Vesuvius* and *Mount Etna*. (See Figs. 69 and 459.) Vesuvius is always quietly active with dangerous eruptions every few years. (See page 40.) A very severe earthquake, which occurred on the island of Sicily in 1908, destroyed *Messina*, and killed many thousands of people.

Climate. The climate of Italy is in many ways similar to that of the Iberian Peninsula because it lies in the westerly wind area in the winter, while in summer the dry southerly winds sweep over it on their way toward the interior of the continent. The larger part of the rainfall, therefore, comes in winter. Italy, like Spain and Portugal, is protected from the cold continental winds of the north by a high mountain barrier. On the east, south, and west it is bathed by the Mediterranean. The climate, therefore, is largely determined by the nearness of the sea, and is warm and even in consequence. In fact the temperature rarely falls below the freezing point except in the higher altitudes. The Mediterranean coast about the Bay of Genoa, known as the Riviera, has such a balmy winter climate that it is a noted winter resort. (See Fig. 460.)

FIG. 460. *Rapello, in the Riviera, near Genoa. The climate here is so delightful that the hotels seen on the slopes are always crowded with visitors.*

Owing to the fact that most of the rain falls in winter, the summers are dry and irrigation is necessary for successful agriculture, as it is in other countries of southern Europe. In the lowlands, where there is an abundance of moisture and where the temperature is high, the climate is unhealthful. Malaria, which results from such conditions, may almost be called the national disease, as more than one-sixth of the people of Italy are afflicted by it.

Products of the Soil. Abundant sunshine and fertile soil make Italy essentially an agricultural country. In the irrigated regions from six to ten crops are raised each year. Owing to the variety of climate in the different altitudes on the mountains, Italy can raise all the crops of northern Europe and very many of the crops of the subtropical regions of the continent. In the basin of the *Po*, with its warmth and abundant water supply, rice is the chief crop. (See Fig. 462.) In-

deed, more rice is raised here than in any other country of Europe. Olives are grown everywhere, and much olive oil is produced. Flax and hemp are leading crops in the northern plain and cotton is raised in southern Italy, Sicily, and Sardinia.

Italy is second to France in production of wine (see Fig. 464), and this together with oranges and lemons is the staple product. Raw silk is also important; more than 6,000,000 people are engaged in raising silkworms. (See Fig. 463.)

FIG. 461. *On the Grand Canal, Venice, with the island of Saint George in the distance.*

Wherever the climate is especially favorable for agriculture every available spot is used. The steep slopes are broken into steps by a series of terraces, the tops of which are cultivated. Here the fields, laid out in a regular plan on the steep hillsides, are very picturesque.

The animal products are not important, except for skins secured from goats raised in the mountain regions.

Minerals. Iron is found in Italy, but is not mined to any extent. Coal is not found; manufacturing is therefore carried on at a great disadvantage. The principal rock products are sulphur and Carrara marble, which is much used by sculptors. The island of Sicily produces from its volcanic fields more sulphur than any other country in the world.

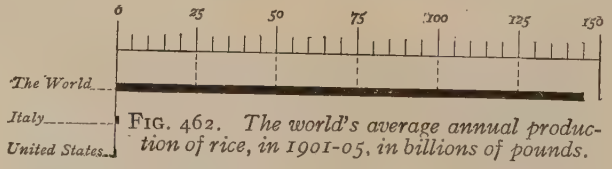

FIG. 462. *The world's average annual production of rice, in 1901-05, in billions of pounds.*

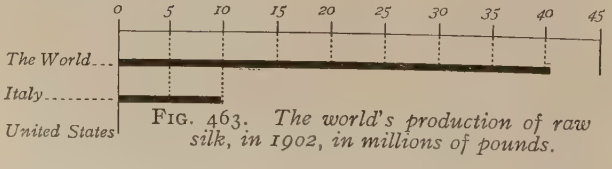

FIG. 463. *The world's production of raw silk, in 1902, in millions of pounds.*

Fisheries. Owing to the fact that Italy has a coast line more than four thousand miles long and indented by many good harbors, fishing is easily and profitably carried on. But so great is the demand that not enough is secured for home consumption. Sponges, sardines, and oysters are the chief ocean products which are of importance in trade. Red coral, which is much used in making jewelry, is secured along the west coast.

Manufacturing. Owing to the difficulties mentioned, manufacturing is backward, though constantly improving. The increased use of the abundant water power and the development of electricity from the falls have greatly stimulated this industry. Silk is produced about *Milan*, famous for its cathedral. (See Fig. 467.) Straw goods at *Leghorn*, Venetian glass, and coral jewelry also are important products.

Trade. Because of the nearness of Italy to Africa and the Suez Canal it has an important carrying trade for the other nations of Europe. Owing to the railroads which connect it with the other countries, it is also able to carry on an extensive inland trade. For the same reason the larger part of its exports to the other countries of Europe go by land in spite of the

fact that the harbors are good and numerous. The most important ports are *Venice*, *Genoa*, and *Naples*. Genoa, on account of its position and its excellent railroad connection with the interior, receives large amounts of the products of Germany in transit to Mediterranean ports and the Far East.

FIG. 464 *The world's production of wine, in 1901, in billions of gallons.*

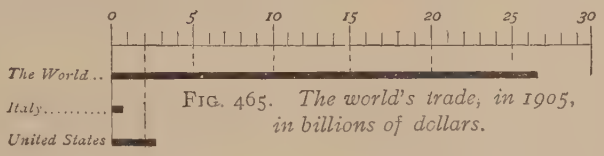

FIG. 465. *The world's trade, in 1905, in billions of dollars.*

The chief imports are cotton, coal, cereals, silk, and timber; from the United States come also machinery and tobacco. The chief exports are raw silk, cottons, silks, olive oil, sulphur, eggs, and wine. Trade is largely with Germany, the United Kingdom, United States, France, and Austria. (See Fig. 465.) The imports from the United States are increasing in value, but the exports to our country are unimportant. They are mainly wine, fruits, and sulphur. The chief commercial cities are in the north where the valleys of the Alps and Apennines converge. *Bologna*, *Turin*, and *Milan* are the chief trade centers in the interior.

People. The people of Italy are descended from many different races, but they are now united by the common Italian language, which is very similar to the Latin language used by the Romans. Like other peoples in semi-tropical countries, the Italians are impetuous, quick-tempered, and somewhat easy-going. They are fond of festivals and sports like the Spanish, and dress in bright-colored costumes.

The Italians have developed agriculture and manufacturing more than have the Spaniards, and Italy as a result is a progressive nation, though not one of the great nations of the world.

Scenery. The volcanoes, mountains, and lakes, of which we have spoken, are visited by many tourists, but the principal places of interest are those which are noted for their history, for their healthful conditions, or for their art treasures.

Rome, the capital, was once the most important city in the world, and now contains many ruins which are signs of its former splendor. (See Fig. 466.) It is also famous for its art galleries which are much visited by tourists and students from all parts of the world. Among its noted buildings are St. Peter's, the largest and most famous church in the world, and the Vatican, an enormous palace occupied by the Pope and containing a wonderfully interesting library. The Pope is the head of the Roman Catholic Church with its enormous membership in all the leading countries in the world. Rome is also the residence of the king of Italy.

FIG. 466. *Ruins of the Forum, Rome.*

Venice, the city in the sea, is built on more than a hundred small islands, and travel is largely by means of boats or gondolas which traverse the many canals. (See Fig. 461.) It is full of beautiful palaces and churches, relics from a former period of richness and splendor. The water and the clear blue sky both add to the general beauty of the region, so that it is a favorite resort for artists.

Florence, with its great olive gardens and its world-famous art galleries, is another city much visited by tourists and artists. *Naples*, the largest city of Italy, on the beautiful bay of the same name, has the threatening Mount Vesuvius in the background. Other cities much visited are *Syracuse* in Sicily and the towns along the Italian Riviera.

Fig. 467. *The Cathedral, Milan.*

Malta. The island of Malta belongs to the United Kingdom. It is important for its coaling stations and fortress protecting the commerce of the Eastern Mediterranean as Gibraltar does that of the Western.

Questions and Exercises

(1) From what countries do the Alps separate Italy? (2) Name some Alpine peaks which are on or near the border of Italy. (3) Compare the height of the Apennines and the Alps. (4) Locate Mount Vesuvius; Mount Etna.

(5) Name the lakes in northern Italy. (6) Tell something about their surroundings. (7) In what part of Italy are large cities most numerous? (8) Why? (9) Why is Venice no longer an important port? (10) Why was it once a leading commercial city? (11) Why do so many Italians come to the United States?

(12) What is the average temperature of the Mediterranean for January? (13) What influence does this have upon the winter temperature of southern Italy? (14) How does the Mediterranean affect the summer temperature? (15) What is the chief factor which determines the rainfall of Italy? (16) What part do the Alpine lakes play in the productiveness of Italy? (17) Why are large portions of the Apennines unforested?

(18) What natural feature of Italy promotes the use of electricity? (19) What influence will this have upon manufacturing in the future?

(20) On an outline or sketch map of Italy draw the Alps and the Apennines, the Po River and its tributaries, and the Tiber. (21) Draw the January isotherm of 40° and the July isotherm of 75°. (22) Locate the three important trade cities of the north; Genoa, Venice, Florence, Rome, and Naples; also two important cities in Sicily. (23) Make a list of the exports of Genoa and Naples. (24) Draw in red the ocean trade routes from Italy to New York and from Italy to the East.

LXI. AUSTRIA-HUNGARY

Size and Surface. Austria-Hungary includes the two countries, Austria and Hungary, which maintain an army and navy in common but are independent in reference to local affairs. About as large as Colorado and Montana, its varied surface ranges from high, rugged mountains to almost unbroken plains. It is an inland region, with the exception of a short, inaccessible coast on the Adriatic, on which *Trieste* is the only important port. (See Fig. 468.) It includes the high eastern Alps, the *Bohemian Plateau*

FIG. 468. *Trieste.*

nearly the whole of the Carpathians, part of the *Dinaric Alps*, which lie mostly in the Balkan Peninsula, and the Plain of Hungary.

Climate. Austria-Hungary is extremely varied in its climate. On the coast the climate is that of the adjoining ocean. In the southern provinces the winters are mild and the summers dry, as they are in most Mediterranean countries. In the interior the winters are very cold and the summers hot, while in the eastern portion the plains belong to the great dry steppe region of Eurasia.

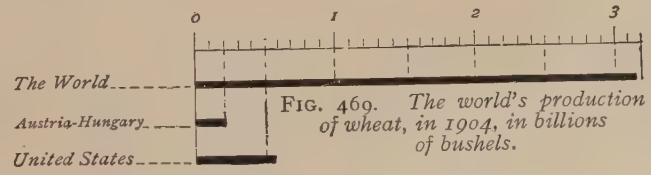

FIG. 469. *The world's production of wheat, in 1904, in billions of bushels.*

Products of the Soil. Austria-Hungary is preëminently an agricultural country, owing to its climate and soil. About two-thirds of the people are farmers and more than three-fifths of the total area is devoted to field crops, pasturage, and hay. (See Figs. 470 and 471.) Owing to the fact that the region is generally dry in the summer, droughts are frequent, and crops sometimes fail.

The country as a whole is a great cereal-growing region and the large crops of wheat in the Plain of Hungary make it one of the great granaries of the world. (See Fig. 469.) Rye is raised in the colder mountain areas, maize is grown in the sunny south, and oats are an important crop in Hungary and northern Austria while the sugar beet is cultivated extensively, especially in Austria. The vine also is cultivated in Hungary, which produces some of the finest wines in the world.

Forests abound in the highland areas of the northwest and in the Carpathians, and furnish products largely made into wine and beer casks for use in France, Italy, and Germany.

Stock Raising. The country as a whole raises more horses than any other country in Europe except Russia. Mules are raised in large numbers in the drier and warmer steppe regions. Poultry is very important in those regions where the underlying rock is limestone and hence well drained, so that the surface is dry. Cattle are raised and dairying is carried on in the higher pastures of the Alps as in Switzerland and France.

Mining. Austria-Hungary abounds in coal and iron, gold, silver, salt, and zinc. Most of the coal produced is mined in Bohemia or in the region north and south of Vienna. Indeed it is the proximity of good coal that determines in a large measure the importance of the manufacturing which centers at Vienna, the chief city of the country.

Manufacturing. Manufacturing has developed slowly, largely because of the lack of new machinery and modern methods, and also because the country has poor connection

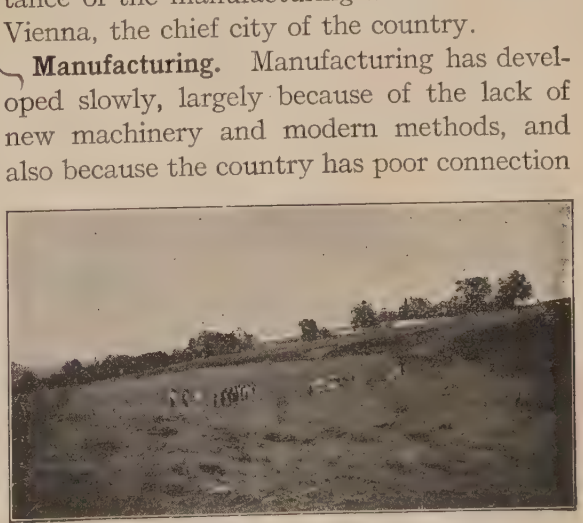

FIG. 470. *Haying near Linz in Austria.*

FIG. 471. *Threshing grain in Bosnia.*

with ocean ports. It is best developed in the north and the northwest, where for that reason the population has become most dense.

Budapest (see Fig. 472), the capital of Hungary, is a great milling city; its dry atmosphere is especially favorable for the milling of wheat into the best of flour.

Textiles are on the whole the leading products of the country. Carpets and silks are manufactured at *Vienna*.

Gloves and leather goods are made at *Vienna*, *Prague*, and at *Innsbruck*. Most of the leather, however, comes from the highlands of Hungary and the Balkan Peninsula.

Another product of Austria-Hungary that is of great importance is Bohemian glass, noted for its beauty of coloring.

Trade. The passes which connect the country with its seacoast on the Adriatic and the gap of the Danube at the Iron Gate are the chief outlets for trade. The few railways center at Vienna and at Budapest.

Vienna is located at the crossing of the chief north-south and east-west routes and hence is the leading commercial city. (See Fig. 376.) The natural highways now followed by the railroads, which converge at Vienna, have been of importance as trade routes since the earliest times. Therefore, Vienna has long been the chief city in Austria, and is one of the most interesting ancient cities of Europe. It has many fine buildings (see Fig. 473), and a noted university.

The railroads are more important than the rivers because the latter flow into interior seas. The Danube, with its trade with eastern and southeastern Europe, is the most important water route.

The imports are chiefly wool and cotton for the textile mills, coal, and tobacco. Cotton is brought from Egypt and the United States. The United States also sends maize, swine products, and pig iron. The chief exports are sugar, eggs, pottery, and beer to other countries. The larger portion of the trade is with Germany and the United Kingdom. The United States is second in the import trade of Austria-Hungary, but receives few exports from that country.

People. Austria-Hungary is a country of many nationalities and many languages. Though the Germans are most numerous in the north and the Italians in the southwest, there are but three provinces in which only one language is generally spoken.

Scenery. Austria-Hungary is an interesting country in which to travel. Its two chief cities are much visited, Vienna because of its present progress and its interesting history, and Budapest because it is one of the most accessible of the cities which are distinctly eastern or oriental in character.

FIG. 472. *Budapest.*

Tirol, adjacent to Switzerland, and Bohemia, in the extreme northwest, are the regions most admired and visited by tourists because of their natural beauty. The Tirolese mountaineers, with their picturesque costumes and their villages among the beautiful mountains, attract many artists to this region.

Questions and Exercises

(1) Name the countries and mountains that border Austria-Hungary. (2) What can you say of its coast line? (3) What geographical reason can you give for the fact that Austria is a difficult country to govern? (4) What part of Austria-Hungary has a mild climate? A dry climate? Cold winters? Heavy summer rainfall? (5) In what way is the Danube the key to the whole country? (6) What are its tributaries? (7) Where is the Iron Gate, and why is it so called? (8) Where would the people of Vienna be likely to go for summer outings? The citizens of Munich? (9) What can you say of the forests of Austria-Hungary? (10) For what products and manufactures is it important? (11) What are the chief imports, and from what countries do they come? (12) Why should leather goods be an important export? (13) Compare the chief industries of Minneapolis and Budapest. (14) In each case tell why this industry is located here. Compare the climate of the two cities, their position, and their population.

(15) How many lines of traffic cross at Vienna? (16) What reason can you give for this? (17) On a map of Europe trace two routes from Moscow to Marseilles; two from London to Constantinople. (18) What city lies at the crossing of these routes? (19) Consult the product map and tell what natural products are found near Vienna. (20) Why has it grown to be a manufacturing city? (21) Why is the term "Gate City" appropriate to Vienna? (22) Find a "Gate City" in the United States. (23) Draw a diagram showing routes by which goods may be sent from Budapest.

FIG. 473. *The public square and market in Vienna.*

LXII. ROUMANIA AND THE BALKAN PENINSULA

ROUMANIA

Surface. Roumania is for the most part a continuation of the great plain of Russia, which has already been described. It also contains the delta of the Danube River, the largest channel for internal trade in Europe. It is separated from the Balkan Peninsula by the Danube River, and is bounded on the west by the Transylvanian Alps and the great rugged wall of the Carpathians.

Climate; Products; Cities. Owing to the inland position of Roumania, it has a great annual range of temperature and has its rainfall in the early summer. The rainfall decreases toward the southeast, so that this portion of the country is a pastoral region. (See Fig. 474.) Elsewhere the area is a great granary, in which maize and wheat thrive, owing to the abundance of sunshine. These products are sent largely to the United Kingdom and Belgium. Salt and petroleum are produced in the region of the Carpathians.

Bukarest, the capital, is a great trade center situated at the crossing of two railroads from

Austria-Hungary to the Black Sea; *Galatz*, from its position on the Danube, carries on trade with Germany. The other towns are small and unimportant in trade.

THE BALKAN PENINSULA

Surface; Importance. The Balkan Peninsula is a distinctly mountainous country, one of the most mountainous in Europe, and includes the several countries, *Servia*, *Bulgaria*, *Montenegro*, *Turkey*, and *Greece*.

Forming as it does a land bridge between the prosperous regions of Europe and the most densely inhabited countries of Asia, the Balkan Peninsula is a great highway of trade. Two important railways follow the natural depressions between the mountains and connect Constantinople and Salonica with Belgrade and thence with the cities of Austria-Hungary.

Climate. The center and the east coast of the Balkan Peninsula have a continental climate with cold winters and warm summers. The greatest rainfall is in summer when the southwest monsoon winds bring moisture from the Mediterranean. The east coast along the Ægean has mild winters and the Adriatic coast has a much warmer winter than is found along the Black Sea. Eastern Turkey is largely a steppe area, owing to the extreme dryness.

Products. Forests cover vast areas of this region and in the forests many sheep and goats are raised, especially in Servia and Greece. These animals feed on the acorns and the beech nuts. In the warmer valleys maize, tobacco, and cotton are raised, but agriculture on the whole is not well developed.

FIG. 474. *Roumanian peasants spinning in their cottage.*

COUNTRIES

Servia. Servia, because of its position, exports a large portion of its swine, cattle, and agricultural products to Austria-Hungary. *Belgrade* is the chief center of trade, and about this city carpets and cotton and silk goods are manufactured.

Bulgaria. Bulgaria is in part fertile and prosperous. Its most valuable products are grain, animals, and the *attar of roses*, a very delicate perfume made from rose leaves. *Sofia* is the chief town and trade center, owing to its position on the Constantinople-Belgrade Railroad.

Montenegro. Montenegro is a small and unimportant country which is so mountainous that stock-raising is the chief industry. It also does some fishing, but its total products are so few that nearly everything except food has to be imported.

Turkey. Turkey in Europe is a small country only about as large as Washington. The greater part of the Turkish possessions, forming the remainder of the Ottoman Empire, are in Asia Minor and in Arabia, though Turkey also has considerable territory in northern Africa. The empire is ruled by a despot, known as the Sultan, who is also the head of the Mohammedan church. It is the only non-Christian country in Europe, and owing to its bad government and its continual persecution of people of other religions, it is very backward in business and enterprise.

Turkey exports fruits, tobacco, mohair, and silk in small quantities, and imports the larger part of its food products and

FIG. 475. *The city of Constantinople.*

manufactured goods. *Constantinople*, on a beautiful harbor known as the Golden Horn, and at the crossing of the land and sea routes to the east (see Fig. 475), controls the Black Sea commerce and is the principal port. *Salonica* is the second port and town in importance.

Greece. Greece has neither fuel nor power, so that it is not adapted to manufacturing. It has few railroads or highways. It has many fine harbors, however, and large numbers of the people are engaged in fishing. In early times its enterprising mariners controlled the commerce of the Mediterranean. Its people have always been seafarers. Agriculture is the chief industry. Live stock, chiefly sheep and goats, are raised. (See Fig. 477.) Fruits are grown by means of irrigation. Olives, tobacco, certain grapes dried and known as currants, and wine (see Fig. 476) from the peninsula and the Greek islands furnish the exports. Textiles and leather working are carried on in the homes of the people.

The chief town is *Athens*, the capital, once the most famous city of the world, and the leader in the arts, poetry, and sciences of ancient times. Athens, like Rome, abounds in evidences of its former greatness, and is much visited for its historic places of interest and because of its many impressive ruins. The most noted and beautiful ruin is that of the Parthenon, an ancient temple situated on a high hill overlooking the city and known as the Acropolis.

Questions and Exercises

(1) Which of the Balkan countries are bordered by the Danube? (2) Explain the importance of the location of Belgrade; of Bukarest; of Salonica; of Constantinople. (3) Trace the routes by which the exports are sent out of these countries to New York.

(4) Describe the coast of Ægean Sea. (5) To what land form do the islands in this sea really belong? (6) Why would you expect the Greeks to be a seafaring people? (7) Why are they not to-day a great carrying nation? (8) Why was it easy for the Greeks to go across to Asia in early times? (9) Locate Athens and tell something of its past history. (10) What famous building was located at Athens? (11) Find out if many Greeks migrate to the United States, and what they do here.

FIG. 476. *City of Thera, on the volcanic island of Santorin. Grapes for wine are grown on the adjacent slopes.*

SUMMARY

Western Europe, with its moist climate and large area available for occupation, is densely inhabited, while the population grows more scanty toward the east, where the dryness precludes occupations which permit people to live closely together. The continent has a great variety of climate and surface and an extensive coast line. Thus nearly all the nations have ready access to the sea, even though they have no seacoast. Within its area have grown up the countries of the world which are most important, not only for their present progress and wealth, but because of their influence upon the world as a whole throughout several centuries. The great nations of Europe have been the leaders in exploring and colonizing the world, and the United Kingdom, Germany, Norway, and France still lead in the work of exploration. Our country was not only explored and developed by Europeans, but our customs, laws, speech, and racial characteristics all show the influence of Europeans. The present position of the European nations is shown by the fact that their influence is important in international affairs the world over. The weaker nations are protected by the stronger, and no small nation can take any step that will produce a change in the political geography of Europe without the approval of the so-called Great Powers. The United Kingdom, Germany, France, and the Netherlands have together more than two-thirds of the trade of the continent, while the continent as a whole has three-fifths of the commerce of the world. The importance of Europe to the United States is clearly indicated by the fact that nearly one-half of our commerce is with the United Kingdom, Germany, and France.

The importance of Europe in trade is best shown by the fact that the United Kingdom, the United States, Germany, Italy, Norway, and France in the order named have the largest merchant fleets. The development of commerce and the possession of dependencies in other parts of the world have caused the United Kingdom, France, United States, Germany, and Japan, to have the five largest navies in the world, while the United Kingdom, Germany, and France, together with the United States, are the chief commercial nations of the globe.

FIG. 477. *Grazing in a dry valley of Greece.*

AFRICA

LXIII. THE CONTINENT AS A WHOLE

Size and Outline. Africa, next to Asia, is the largest continent (see Fig. 28), but it is outranked in population by both Asia and Europe. It lies very close to Europe and is joined to Asia by the narrow isthmus of Suez. Africa extends from the latitude of Richmond, Virginia, to that of Buenos Aires; hence it lies almost wholly in the tropics. The coast line is regular. As the continent has no deep estuaries or pronounced peninsulas, it possesses few good harbors. (See Fig. 482.)

FIG. 478. *The position of Africa among the continents.*

There are no important islands bordering the coast of Africa. *Madagascar*, the largest island, is not connected with the continent by any shallows, and hence is an oceanic rather than a continental island. (See Fig. 481.)

Surface. The surface of Africa consists for the most part of a series of great plateaus with mountain ranges rising above them, and a narrow hem of lowlands along the coast. The average altitude of the land in the northern half of the continent is under 2,000 feet, although this portion contains the *Atlas Mountains*, which rise to a height of more than 14,000 feet along the northwestern coast. Just to the east of the Atlas range is a small area below sea level.

Another highland runs northeast and southwest across the continent from a point on the western shore of the Red Sea to a point north of the Gulf of Guinea.

The average elevation of the rest of Africa is about 4,000 feet. This region includes the *Plateau of Abyssinia* on the east, the most important highland of the continent. This plateau extends to the south, and is really continued into the *Kwathlamba* or *Drakenburg Mountains* of South Africa, although the highland is lost sight of in a part of East Africa. (See Figs. 478 and 481.) Close to the equator a series of old volcanoes rises to a height of 18,000 or 19,000 feet. Among these are *Kilima-njaro* and *Kenia*, the highest mountains of Africa.

Drainage. Although Africa contains some of the largest and longest rivers in the world, it is more deficient in routes for interior water commerce than any other continent. Each of the great rivers is interrupted somewhere in its lower course by a series of falls which acts as a barrier to trade and travel. It is in part for this reason that the exploration of Africa has been so long delayed, and that the interior trade is still in a backward condition. The largest streams flow to the Atlantic, as they do in nearly all the continents.

The longest river is the *Nile*, which flows north from the highlands down a succession of terraces into the Mediterranean. (See Fig. 480.) The size of this stream varies greatly at different times of the year. It receives most

of its water from its eastern tributary when the wet seasons prevail in the highlands.

The *Congo*, flowing down across the interior plateau to the west, is the second largest river system of the continent, and one of the largest in the world. It opens up the vast interior forests of Africa, but is so interrupted by rapids that it cannot readily be used as a trade route. (See Fig. 490.)

FIG. 479. *The rolling surface of the land in the grazing country of South Africa.*

In western Africa, north of the equator, the *Niger* is the principal stream.

In the southern portion of the continent the divide between the east and west drainage is mostly to the west of the highland, so that the large rivers, the *Zambezi* and the *Limpopo*, have to cut through the ridge to reach the sea.

More than a fourth of the continent has interior drainage, a greater proportion than is found in any other continent except Asia. In this region of interior drainage lies the large fresh-water lake, *Lake Chad*, which in times of flood has an outlet to the northeast into a low, salt basin.

Climate. Owing to the position of Africa in the Hot Belt, the climate is everywhere tropical except in the extreme south. In the southern summer Africa lies entirely in the trade-wind region and the region of the doldrums; the northern part in the northeastern trade-wind belt, the central portion in the doldrums, and the south in the southeastern trade-wind belt. In the southern winter these winds occupy the whole continent north of the southern tropic. As a result the climatic features are very symmetrical on both sides of the equator. (See Fig. 76.)

The rainfall of Africa, except in the equatorial region, is extremely small. Throughout the larger part of northern Africa the annual rainfall is less than twenty inches, though on the northern, or windward slopes, of the Atlas Mountains it increases to more than forty inches in places.

The northeastern trade winds, originating in Asia or in southern Europe, pass over so small an area of water that they do not receive all the moisture they can carry. As they pass over Africa they grow warmer and therefore become capable of absorbing more moisture. Hence they evaporate the moisture from the lands over which they blow, and as a result we find the largest desert in the world in northern Africa. The only rainfall in this desert region occurs on the scattered peaks which rise above the plateaus of the Sahara to an altitude of more than 6,000 feet.

FIG. 480. *Egyptian sailing vessels on the Nile.*

The rainfall of southwestern Africa is under twenty inches; most of it falls in summer when the trade winds bring moisture from the Indian Ocean.

FIG. 481.

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Central Africa, between 10 degrees north and 15 degrees south latitude, is occupied by the doldrum belt and therefore has a heavy rainfall. It is heaviest along the western coast, reaching a maximum in Liberia. Owing to the excessive warmth and moisture and the prevalence of swamps, this region is the most unhealthful in the world. The plateaus of the tropical region, however, rise to a sufficient height to have a climate cool enough for occupation by white people. Even in these more favored sections, however, the climate is so unhealthful that no one yet knows whether or not Central Africa is likely to be permanently occupied by the white race.

Vegetation. The vegetation regions of Africa are distributed in accordance with the distribution of the rainfall. The coastal areas north of the Atlas Mountains are grass regions with trees, and can be cultivated. The southern slopes of the Atlas are a great steppe, which in turn merges into the immense desert plain, *Sahara*, with practically no vegetation except that found in the oases. Grassy steppes are also found south of the Sahara, lying between the tropical savannas and the desert. This savanna region grows wider toward the east in the Sudan. (See Fig. 119.)

Central Africa is entirely occupied by open savannas and tropical forests; the forests are more dense than those found anywhere else in the world except in the valley of the Amazon.

In the well-watered regions of the southeast, grasslands and agricultural regions are found. In the southwest is a steppe region with deserts close to the Atlantic coast. This desert region, known as the *Kalahari*, is not so dry as the Sahara, as is shown by the fact that it has heavy dews almost every night. The dews are formed, of course, by the chilling of the air, so that some of the moisture which evaporates during the intense heat of the day is again condensed.

Animals. The animals of northern Africa as far south as the northern tropic are like those of Europe. The rest of Africa belongs to the Ethiopian Region, the general features of which have already been described. (See page 75.)

In the savannas are great numbers of antelopes and giraffes which feed upon the grass. Here are found also the carnivora, or flesh-eaters, such as the lion, the hyena, and the leopard, which prey upon the grass eaters. In the forest regions are the tusked elephants, now being rapidly destroyed, and the man-like apes. Crocodiles and hippopotamuses (see Fig. 147) abound in all the rivers of the tropical region. Camels and ostriches are found in the desert and steppe areas and are of great value to man.

People. North of the southern Sahara the native people of Africa all belong to the white race. Elsewhere they are blacks, although Europeans are found scattered in the various colonies, and in great numbers in South Africa. (See Fig. 169.) The blacks abound in the Sudan and in tropical Africa, and the Bantus, or light-colored blacks, in South Africa. (See Figs. 489, 494, and 495.) In the Congo forests are the primitive and dwarfed Negritos, the smallest people in the world.

Questions and Exercises

(1) Write a composition comparing Africa and North America, making statements about each as to (*a*) its position as regards the equator, (*b*) its distance and direction from Europe, (*c*) its coast line, (*d*) its harbors, (*e*) the effect of its coast line on settlement. (2) Study the relief map and tell what influence the eastern highland has upon the rivers which cross it. (3) In what latitude is the source of the Nile? The mouth? (4) Compare the length of the Nile and the Mississippi in degrees of latitude; of the Zambezi and the St. Lawrence. (5) Study the physical and commercial maps and tell which rivers of Africa are most important commercially. (6) Why is the Niger of less importance than the Nile? (7) Find out something about the Congo. (8) Give the reason for rainfall on the high plateaus of the Sahara. (9) Where is tropical Africa? (10) Which

Longitude West 20° from Greenwich — Longitude East from 20° Greenwich

Revised, 1910

FIG. 482.

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part is more likely to be occupied by white people? (11) During what months do the heavy rains of this region occur? (12) Why does the southeastern coast have rain when the interior is dry? (13) Tell why the animals of northern Africa are similar to those of Europe.

(14) Draw on a sheet of blank paper two small sketch maps of Africa. On the first draw the Heat Equator and color in red that part of Africa in the Hot Belt. On the second draw the Heat Equator; indicate the direction of the winds, and the regions of heaviest rainfall.

LXIV. NORTHERN AFRICA

Countries. Northern Africa includes *Morocco*, *Algeria*, *Tunis*, *Tripoli*, *Egypt*, and so much of the northern portion of the Sahara as is under the protection of these countries. With the exception of the coast region of Algeria, all this vast country is a desert in which irrigation is necessary to carry on agriculture. Irrigation is practiced largely about the oases and in the river valleys of Morocco, Tunis, and Egypt.

FIG. 483. *A street bazaar in Siut on the Nile above Cairo.*

EGYPT

The Valley of the Nile. Egypt is a tributary state of Turkey, though some of its affairs are managed by the English government. It consists practically of the valley of the Nile with the bordering desert areas.

The Nile, famous for its annual floods, receives the most of its water from the Plateau of Abyssinia, where the rainfall is greatest in the summer months. The river begins to rise about the twenty-sixth of June and begins to overflow in September. As the water settles it leaves exposed the flood plain, which it has thoroughly saturated with water and covered with a fine layer of silt. This silt forms a very excellent soil for agriculture, and therefore farming can be carried on with profit wherever irrigation is possible. The flood plain of the Nile, because of its annual floods, has long been famous as an agricultural region. It is the seat of an extremely ancient civilization, which was made possible by the natural productiveness of the region. Its famous cities have long since declined in importance or have disappeared, but their ruins remain as a witness to the country's former splendor.

Irrigation. Two kinds of irrigation are practiced in the basin of the Nile. In Upper, that is, southern, Egypt the water is gathered in large natural basins and will irrigate the neighboring region for about two and a half months of the dry season. The principal crops, therefore, are those that mature in a short growing season, such as beans, clover, wheat, and barley.

In the delta portion the water is pumped from the river, or in some way distributed over the land so that it can be used at all seasons. Thus, in this section agriculture is possible the year through, and the principal crops are those that require a long growing season, such as sugar cane, dates, and rice, though wheat, maize, and durra, the principal food of the people, are raised in large quantities.

A great dam has recently been completed at Assuan, so that the water of the Nile can be held back from November to April and let out upon the lower countries as it is needed. The lake thus formed is about two hundred miles long. Irrigation can now be practiced in Lower or northern Egypt to a far greater extent than ever before, and it is expected

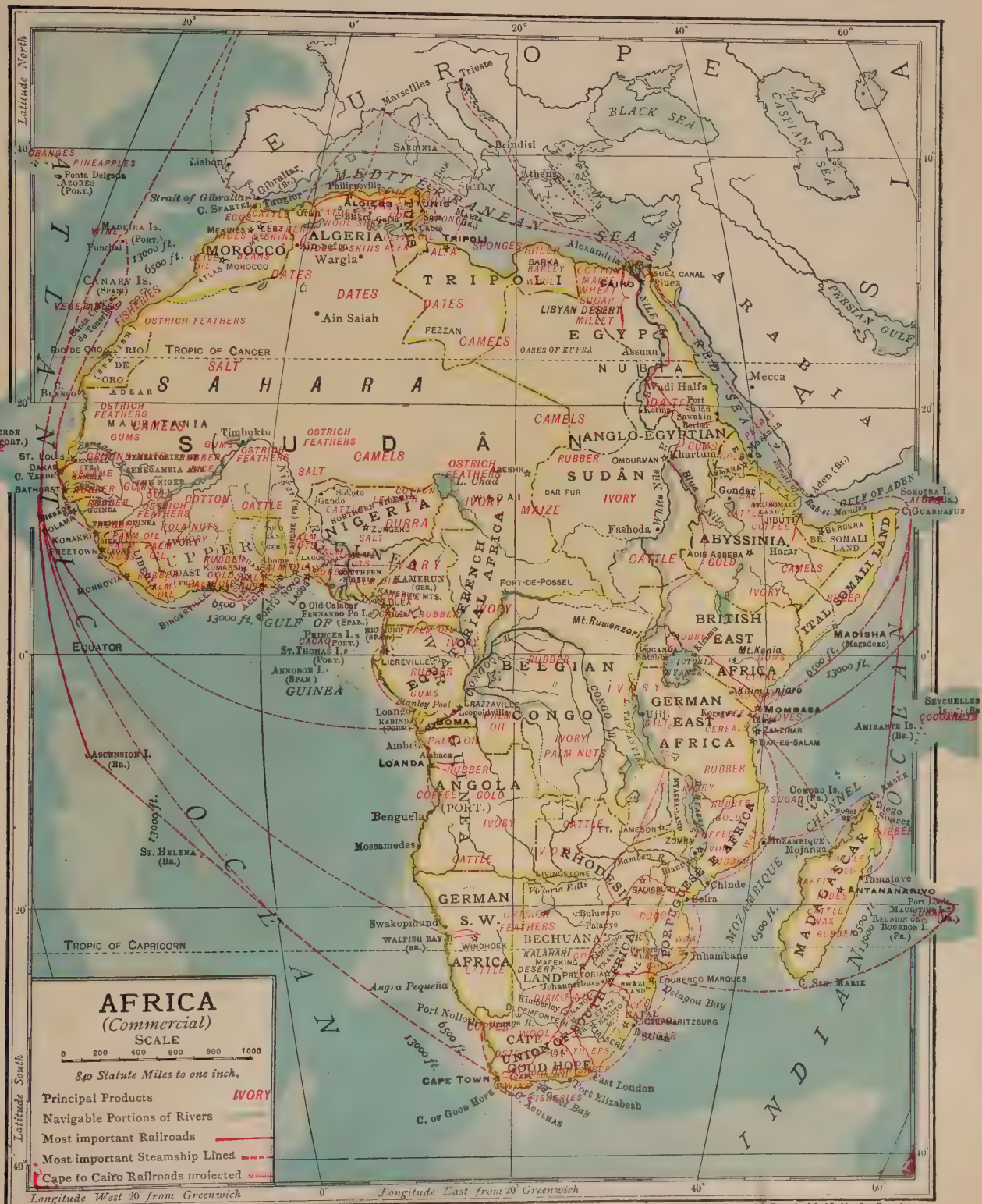

FIG 484.

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that the area devoted to agriculture will be greatly increased.

Products of the Soil. Upper Egypt produces wheat, barley, corn, clover, and beans. Wheat is the leading crop, and occupies one-half the agricultural area. Lower Egypt raises cotton, wheat, millet, sugar cane, rice, and sub-tropical fruits, such as figs, dates, lemons, and oranges. Cotton is the most important product. Egyptian cotton is very valuable, owing to its long fiber, which is much prized in fine spinning.

FIG. 485. *The port of Suez, an important commercial distributing point.*

Trade. Nearly one-half of the trade of Egypt is with the United Kingdom and one-fifteenth with Germany. The chief exports are cotton and cotton seed; the chief imports are cotton manufactures, coal, wood, and metals. Ivory and rubber are secured from the most southern portions of Egypt. A large quantity of these products is also sent out by way of the coast of West Africa. Vast areas in Egypt could be improved but for poor labor and the lack of cheap communication.

Cities. *Cairo*, a picturesque and ancient city at the head of the delta of the Nile, is the capital of Egypt. Cairo is a favorite resort for tourists who desire to visit the famous Pyramids and the Sphinx, or to take the trip up the Nile. (See Figs. 127, 483, and 488.)

Alexandria, at the mouth of the western distributary of the Nile, has long been the chief port of Egypt. *Port Said*, at the northern extremity of the Suez Canal, is a coaling station. Through it passes a great quantity of valuable products from the Far East.

The Suez Canal. The Suez Canal from Port Said to Suez is eighty-seven miles long and lies entirely in Egypt. The completion of this canal has not only greatly shortened the distance by water between western Europe and the East Indies, but it enables vessels to follow a safer route than that around the Cape of Good Hope. (See Figs. 161, 485, and 486.)

FIG. 486. *Steaming through the Suez Canal.*

About four thousand vessels pass through the canal annually; a number, however, not nearly so great as that passing through the Sault Ste. Marie Canal in the United States. But it should be remembered that the vessels passing through the Suez Canal are nearly all loaded with goods of such a character that great value is concentrated in a small bulk, so that the wealth passing through the Suez Canal far surpasses that carried through any other canal in the world.

TRIPOLI

Characteristics; Trade. Tripoli is a Turkish province and includes the oases of Fezzan and the small plateau of Barka. The oases are the only rich portion of the region. *Tripoli*, the only seaport and the chief town, is the northern terminus of many important caravan routes across the Sahara. (See Fig. 487.) The chief exports,

with the exception of dates, which are produced at home, are brought to Tripoli by caravans from the interior. They include ostrich feathers, ivory, skins, and gold.

ALGERIA AND TUNIS

Algeria and Tunis are both dependencies of France. Algeria is her richest and most valuable colony, and Tunis is under French protection. Many railroads and highways have been built in Algeria at national expense; harbors have been constructed and artesian wells have been sunk. The people are progressive and the country is increasing in importance.

FIG. 487. *A caravan preparing to start across the Sahara.*

Climate and Soil. The climate of both countries is like that of Spain and Italy, distinctly Mediterranean. The most important agricultural region lies on the coast of Algeria and is known as the *Tell*. Another rich region is in Tunis in the valley between the ranges of the Atlas mountains, where the chief river floods the country after winter rains and enriches it, very much as the Nile enriches Egypt. The region south of the Atlas is occupied by nomadic tribes, except where an occasional oasis gives opportunity for permanent habitation. (See Fig. 169.)

Products; Exports. The Tell exports olive oil, wheat, barley, and early vegetables. Alfa grass, which is very important in paper making, grows on the plateau between the north and south ranges of the Atlas mountains.

Cork oak is found in both Algeria and Tunis; Algeria exports more than Spain and Portugal combined. It also exports phosphates, iron, and zinc. Other important exports are dates and excellent wine.

Sheep and goats graze in large numbers in the higher regions, but owing to the scarcity of water during the summer the amount of grazing is limited.

Cities. *Algiers*, the chief port of Algeria, is an important coaling station for Mediterranean vessels. The Arab portion is situated on a hill with the modern town at its foot.

Tunis, owing to its location, is more important as a port than Algiers. It is connected with the sea by means of a canal so that ocean-going vessels can land at its wharves.

MOROCCO

Morocco is an independent Mohammedan country in which European influence has thus far had little effect; indeed, large areas in the country are not safe for Europeans. The surface is rugged except along the coast, and includes the southwestern portion of the Atlas Mountains. Owing to the absence of railroads or highways, all travel is by horse or camel.

Climate; Trade. Morocco has a fine climate, excellent soil, and mineral wealth, especially in copper; but these conditions have been little utilized except for raising tropical fruit.

Tangier is the only port of importance in Morocco, and the center of what little trade the country has. The commerce is small and is chiefly with England and France. It includes small quantities of grain, eggs, beans, almonds, wool, oil,

FIG. 488. *Sakkara, a Nile village near Cairo. Close by are the most celebrated of the Pyramids.*

and some few characteristic manufactures such as Fez caps and leather. The manufactured products are sent, for the most part, to the other countries in northern Africa.

Questions and Exercises

(1) During what season does the upper Nile overflow? (2) How do the people get the water from the river to their fields? (3) What European country is chiefly interested in promoting trade and means of communication in Egypt? (4) Find out what you can about the Cairo and Cape Railroad. (5) Account for the location of Cairo. (6) Compare the rainfall of Cairo and New Orleans. (7) What effect has the climate of Egypt had upon the preservation of its ancient monuments? What do you know about the effect of a more moist climate upon stone? (8) Make a comparison between the Suez and "Soo" canals as to position, width and length, amount of tonnage, value of tonnage, and general importance.

(9) Why should Tripoli be more of a terminus for caravan routes than Tunis? (10) In what ways has French control been of benefit to Algeria and Tunis? (11) Why is Morocco so little developed? (12) Find out all you can about the caravans of Africa.

FIG. 489. *Natives and their mud hut villages in Portuguese East Africa.*

LXV. CENTRAL AFRICA

Countries and Ownership. Central Africa includes all the continent lying between the northern tropic and German Southwest Africa. Within this vast territory there are now only two independent states—*Liberia*, a negro republic, and *Abyssinia*.

Abyssinia, a country of lofty tablelands, is ruled by a king. Belgian Congo, once an independent state, is now a colony of Belgium. The other countries are controlled by European nations, especially the United Kingdom, France, Germany, Portugal, and Italy. Each of these nations is constantly endeavoring to increase its holdings, and almost every year, new boundary lines are being established.

FIG. 490. *The Congo River. Notice the dense forest and the canoe dug from a log.*

Climate. The climate of central Africa is everywhere tropical in temperature and varies in the amount of moisture from the extreme dryness of the greatest desert in the world to the exceedingly rainy regions of the Congo Basin. (See Fig. 97.) In the lowland regions the climate is extremely weakening for white people, and malaria is common even among the natives.

Products of the Soil. In the grassy steppe region of the Sudan, just south of the Sahara, date palms and cereals are grown. In Upper Guinea and the southern British Sudan, cotton, maize, and millet can be raised.

In the damp equatorial belt of the Congo Basin and on the eastern coast the products are all derived from the forests, chiefly from the cocoa and oil palms and the banana trees. The oil is exported for use in making soap, and bananas are the chief food of the people. South of the Congo, in the savanna regions, cotton, maize, and millet are produced, as in the similar region to the north. In German and British East Africa rubber, ivory, and coffee are the chief products.

Development. The development of central Africa, the country of the Blacks, has been very

FIG. 491. *Dar-es-Salam, the Capital of German East Africa. Note its modern appearance.*

slow. Most of the countries have anything but a settled government and the slave trade is still carried on. The soil is not generally fertile, and the means of communication with the interior are poor. Navigation on the great rivers is interrupted by falls and rapids, which means that goods must oftentimes be unloaded, transferred around the rapids, and reloaded, so that the cost of carrying on commerce is excessive.

FIG. 492. *Negro warriors of Central Africa. Notice their hut behind them.*

In the north, products are transported largely by caravans, which take three months to go from Sudan to Tripoli. (See Fig. 484.) On the east coast, owing to the absence of roads, goods are carried by human porters. Each porter will carry from fifty to a hundred pounds, and will cover from eighteen to twenty-two miles a day. Oxen cannot be used on account of the tsetse fly, whose bite is fatal to cattle. For these reasons development has been extremely backward. However, the progress made in this region in recent years in spite of the difficulties has been greater than the early great explorers, Livingston and Stanley, deemed possible.

Trade. Oil and oil seeds, ivory, and rubber are the chief exports of central Africa. The amount of these products is constantly decreasing, however, owing to the reckless way the sources of supply are destroyed. This is especially true of ivory (see Fig. 484), as the elephants are killed faster than they can increase.

Lagos, in Nigeria, is one of the chief ports. It has a large trade in palm oil. *Loanda*, in Angola, is the second port in importance. Dar-es-Salam (see Fig. 491) is the only good harbor on the German coast.

Questions and Exercises

(1) What has prevented the rapid opening up of the Congo region to European civilization and trade? (2) Compare the Congo and the Amazon, in location, climate, products, accessibility. (3) What modern substitute do we have for ivory? (4) Trace a caravan route from Sudan to Tripoli; from Timbuktu to the southern slopes of the Atlas. (5) Draw the chief rivers and locate important caravan and other routes. (6) Show the railroad connections between Lourenço Marques and towns in South Africa. (7) How many independent states are there in central Africa?

FIG. 493. *A view of Delugoa Bay, the harbor of Lourenço Marques, Portuguese East Africa.*

FIG. 494. *A native kraal or village in the plateau region of South Africa.*

LXVI. SOUTH AFRICA

Climate and Surface. South Africa includes *German Southwest Africa*, *Portuguese East Africa* and *British South Africa*, the northern portion of which really lies in the tropics. The climate of the extreme southern portion of Africa is temperate and in many ways like that of the United Kingdom. The *Transvaal*, *Orange Free State*, *Natal*, and *Cape of Good Hope*, now form the *Union of South Africa*. All of these countries have a climate so similar to the climate of the British Isles that the English people have found it easy to adapt themselves to the new conditions

FIG. 495. *The framework of a native hut in South Africa.*

Throughout southern Africa the highlands extend close to the coast and rise abruptly, so that any moisture-bearing winds lose their moisture quickly and the interior receives little rainfall. (See Fig. 97.)

On the east the Kwathlamba Mountains (Drakenburg) rise close to the coast and slope down on the west to the interior plateaus, which lie at an altitude of about 2,000 feet. They cut off the moisture and the rains brought by the southeast trade winds, and hence the tablelands of the interior are subject to drought.

In the western portion, lying in the lee of the mountains and plateaus, is the *Kalahari Desert*. In the southwest are tablelands from two to three thousand feet in altitude, rising above the sea in terraces, and known as the *Great* and the *Little Karroo*.

Products of the Soil. Along the eastern and southern coasts of South Africa agriculture is carried on. Cereals, fruits, and tea are the chief products. Some of the fruits are now brought to the United States. Sugar (see Fig. 499) and tobacco are produced in the southeast, but are largely consumed at home.

Stock Raising. Ostriches are raised in the southeast in large numbers for the sake of their feathers. Grazing, however, is the most widespread industry. Sheep are the most important animals, especially in the *Transvaal* and *Orange Free State*. Goats are raised in the harsher climate east of the Great Karroo. Cattle are important on the coast, in the Transvaal, and in German Southwest Africa, where the surface of the country and the climate favor grazing. (See Fig. 479.)

F e method of traveling across the veldt, as ng country of South Africa is called.

FIG. 497. *The market square at Johannesburg.*

Mineral Products. The Transvaal contains unusually rich gold deposits which are extensively worked. It ranks next to Australia and the United States in the production of gold. (See Fig. 498.) *Johannesburg* (see Fig. 497), the chief town, is the leading mining center. *Pretoria*, the capital, is connected with Lourenço Marques by a railroad.

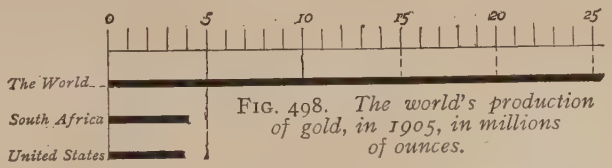

FIG. 498. *The world's production of gold, in 1905, in millions of ounces.*

Kimberley lies in the center of extensive diamond fields, and exports more than nine-tenths of the diamonds used in the world.

Trade. Owing to the regular coast line South Africa has few good harbors and even those that can be used are often swept so severely by winds during the southeast trades that shipping is not safe. *Cape Town* (see Fig. 500), *Port Elizabeth*, and *Durban* have good harbors but the best is that of Lourenço Marques on the east coast. (See Fig. 493.) The land rises abruptly, hence the railroads into the interior follow heavy grades, and the cost of transportation is great. (See Fig. 496.)

The commerce of South Africa is practically all with the United Kingdom. Gold is by far the most important export, and diamonds, wool, angora hair, and ostrich feathers are the other chief products in trade. Trade with the United States is unimportant.

Questions and Exercises

(1) What European nation first settled in South Africa? What names on the map recall this occupation? (2) What attracted the British to this region? (3) In which parts of the country are there rich mineral deposits? Locate two important mining towns. (4) Through what ports are these products sent to England? (5) Make a list of the countries composing British South Africa, and opposite each write the names of the chief towns.

(6) On an outline map of Africa color in red all the British possessions in Africa, in blue all the German possessions, in yellow all the French possessions. (7) What do you notice about the British possessions? (8) Why are these foreign nations so eager for control in Africa? (9) Why are the British so desirous of building a railroad from the Cape to Cairo?

(10) Tell how the surface of South Africa has influenced the distribution of vegetation; the means of communication. (11) Tell why the great lakes of Africa are of less commercial importance than the Great Lakes of the United States. (12) Show on a map of Africa the trade routes between the commercial countries of Europe and the Suez Canal. (13) Show the ocean routes between Europe and the East before the construction of the Suez Canal. (14) In what way is South Africa like portions of Australia? (15) Why have British colonies developed rapidly in South Africa? (16) What season of the year is it at Cape Town now? (17) What products have you ever seen that came from South Africa?

FIG. 499. *Cutting sugar cane near Pretoria.*

LXVII. ISLANDS NEAR AFRICA

MADAGASCAR

Surface and Industry. *Madagascar*, a large island lying two hundred and fifty miles southeast of the coast of Africa, belongs to France. It is mountainous throughout, but is well watered and abundantly supplied with grass. Cattle raising is the leading industry. Gold, rubber, cattle, and raffia are the chief exports. The commerce, which is small, is centered at *Tamatave*, the only good port. (See Fig. 501.)

FIG. 500. *A general view of Cape Town, South Africa, at the foot of Table Mountain.*

MAURITIUS AND RÉUNION

Ownership and Products. *Mauritius*, belonging to the United Kingdom, and *Réunion*, belonging to France, are two small islands east of Madagascar. They are both covered with tropical plantations producing a large amount of sugar. Sugar, therefore, forms the principal export; it is sent especially to India.

ISLANDS OF THE ATLANTIC

Ownership and Products. Of the islands on the west coast of Africa the *Azore*, the *Madeira*, and the *Cape Verde* belong to Portugal. The Azores raise oranges and pineapples, and the Madeiras produce wine and fruit. The Cape Verde Islands are unimportant except that the Island of St. Vincent is a coaling station for Atlantic steamers. The *Canary Islands* belong to Spain and produce early vegetables for the London market. St. Helena, best known as the place of imprisonment of the great Napoleon, is a British coaling station.

FIG. 501. *A street bazaar, Tamatave, the port of Antananarivo, Madagascar.*

Questions and Exercises

(1) Why is Madagascar an oceanic rather than a continental island? (2) Why is it so well watered? (3) To what European ports do its products go? (4) What two islands are near Madagascar? (5) To what country do they belong? (6) What groups of islands lie west of Africa? (7) For what are they important? (8) To what countries do they belong?

SUMMARY

Africa is the second largest continent, but, owing to its unfavorable climate and the difficulties encountered in travel, it is the least progressive and the least developed. Only the coastal areas of the more temperate regions are occupied by Europeans, and European influence has had but little effect throughout the continent. Its commerce is therefore not very important and amounts to only one-tenth of the commerce of the world. The most progressive regions are in the temperate areas of the south.

The rich tropical regions of central Africa are almost inaccessible and are separated from the ports on the northern coast, that are within easy reach of southern Europe, by a vast desert which is difficult to cross. The inhabitants are largely primitive people, who live on the natural resources of the country and who contribute little to the world's commerce, except ivory, skins, gums, and other similar products. (See Fig. 492.)

ASIA

LXVIII. THE CONTINENT AS A WHOLE

Size and Position. The continent of Asia is more than twice the size of North America (see Fig. 28); it includes more than one-third the land of the world and more than one-half of the people. It lies entirely in the Northern Hemisphere, but its southern point extends to within ninety miles of the equator, and its northern coast lies halfway between the Arctic Circle and the Pole. (See Fig. 502.) Its most western point in Asia Minor is in the same longitude as Bukarest, and its most eastern extremity almost touches North America at Bering Strait.

FIG. 502. *The position of Asia among the continents.*

The populous countries of Asia are separated from North America by the Pacific Ocean, and from the progressive nations of Europe by the great land mass lying between. (See Fig. 502.) Hence Asia has remained somewhat isolated commercially, and even now but few of its nations have any conspicuous part in the world's trade. The southeastern coast of Asia and the East Indies, however, have long been of interest to all the people of Europe because of their valuable products, which were sought by explorers in early times.

Coast Line. The coast of Asia is bordered by a great number of seas, bays, and gulfs, extending in an unbroken series from Bering Strait on the northeast to the Red Sea on the African boundary. (See Fig. 503.) These seas, with their protected waters, have always favored the development of coastwise trade except in the north and northeast where the waters are frozen for many months in the year. There are several good harbors on the southern and southeastern coasts which are situated in a favorable climate and are of great commercial importance. The southern peninsulas are broad and fertile and have therefore favored the development of a large population, much larger and denser than can be accommodated in the smaller peninsulas of southern Europe.

The Great Northern Plain. Asia includes a larger area of plains than any other continent. The great northern plain, which extends from south of the Caspian Sea to Bering Strait, is a continuation of the plain of northern Europe. A large part of this great region lies less than six hundred feet above the level of the sea, and its surface is but little broken by hills. As a result, there are no barriers to break the force of the winds which sweep across the plains with great force in winter.

The southwestern portion of this plain is, in part, below the level of the sea, and contains a broad area of interior drainage. Here we find several salt lakes and seas, which, from evaporation and other causes, have much decreased in size as compared with the past. They are now only shallow bodies of extremely salt water surrounded by gently sloping shores, the soil of which is full of salt.

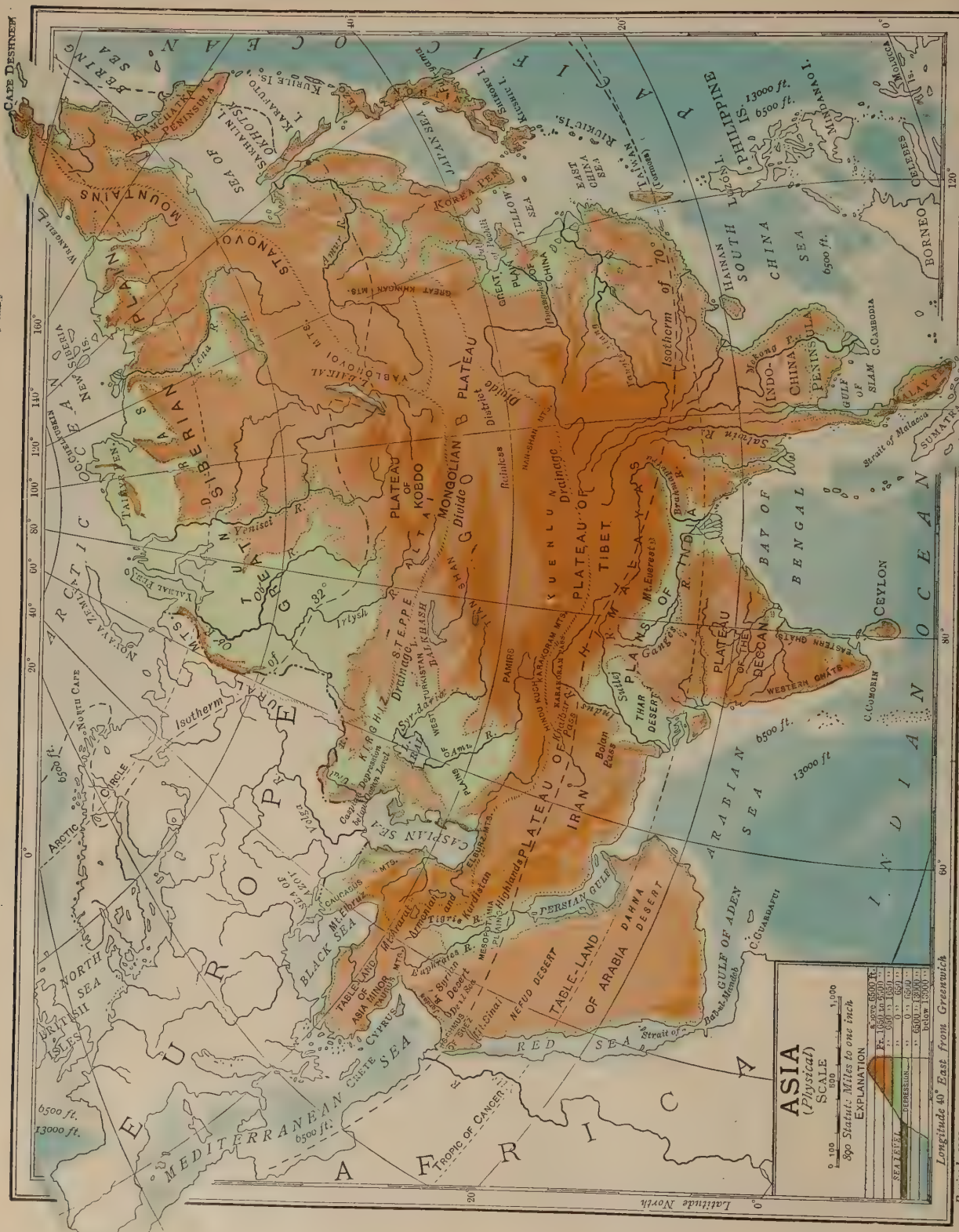
ASIA
(Physical)
SCALE
90 Statute Miles to one inch
EXPLANATION
Ft.
SEA LEVEL
DEPRESSION
Longitude 40° East from Greenwich
Latitude North
Revised, 1911
Copyright, 1903, by Rand, McNally & Company
EUROPE
AFRICA
INDIAN OCEAN
ARCTIC OCEAN
PACIFIC OCEAN
SIBERIAN PLATEAU
MONGOLIAN PLATEAU
PLATEAU OF TIBET
HIMALAYAS
PLATEAU OF IRAN
PLATEAU OF ARABIA
PLATEAU OF THE DECCAN
STEPPE
DESERT
MOUNTAINS
SEA
BAY OF BENGAL
ARABIAN SEA
CASPIAN SEA
BLACK SEA
RED SEA
PERSIAN GULF
GULF OF ADEN
GULF OF SIAM
Cape Desnieff
Bering Sea
Kamchatka Peninsula
Sea of Okhotsk
Japan Sea
Korea Pen.
Yellow Sea
East China Sea
Philippine Is.
Borneo
Celebes
Sumatra
Ceylon
Indo-China Peninsula
Malay Pen.
Strait of Malacca
Hainan
South China Sea
Taiwan (Formosa)
Riukiu Is.
Kurile Is.
Sakhalin I.
New Siberian Is.
Wrangel I.
Novaya Zemlya
North Cape
Arctic Circle
Tropic of Cancer
Equator
Isotherm of 70°
Isotherm of 32°
Caucasus Mts.
Mt. Elbruz
Elburz Mts.
Kuen Lun Mts.
Himalaya Mts.
Hindu Kush Mts.
Karakoram Mts.
Pamirs
Nan Shan Mts.
Great Khingan Mts.
Yablonoi Mts.
Stanovoi Mts.
Altai Mts.
Thian Shan Mts.
Kirghiz Steppe
Turkistan Desert
Gobi Desert
Syr-dar-ya R.
Amu R.
Indus R.
Ganges R.
Brahmaputra R.
Irrawaddy R.
Salween R.
Mekong R.
Yangtse R.
Hoang-ho R.
Amur R.
Lena R.
Yenisei R.
Ob R.
Volga R.
Euphrates R.
Tigris R.
Mesopotamia
Kurdistan
Mesopotamian Highlands
Syrian Desert
Nefud Desert
Dahna Desert
Table-land of Arabia
Table-land of Asia Minor
Cyprus
Crete
Mediterranean Sea
Black Sea
Caspian Sea
Aral Sea
Lake Baikal
Lake Tali-Nor
Lake Balkash
Lake Urmia
Lake Van
Lake Aral
Lake Baikal
Mt. Everest
Dhaulagiri
Kinchinjunga
Nanga Parbat
Karakoram Pass
Khyber Pass
Bolan Pass
Thar Desert
Western Ghats
Eastern Ghats
C. Comorin
C. Guardafui
Bab-el-Mandeb
Strait of
Divide
Watershed
Plateau
Mts.
Pen.
Is.
R.
Sea
Gulf
Bay
Ocean
Desert
Pass
Strait
Cape
Lake
Basin
Depression
Level
Land
Table-land
Highlands
Steppe
Tropic
Circle
Isotherm
Equator
Meridian
Parallel
Scale
Explanation
Sea Level
Depression
Ft.
Miles
Statute
Nautical
Inch
Feet
Metres
Kilometres
Degrees
Minutes
Seconds
Latitude
Longitude
Greenwich
East
North
South
West
Revised
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Fig. 503

Rivers of the North. The great rivers of the plain, the *Ob-Irtysh*, the *Yenisei*, and the *Lena*, flow northward. Their headwaters, thawing out in the spring before their lower courses have melted at all, pour down an enormous volume of water which floods the country and does great damage. In the middle of the summer these rivers are navigable for several hundred miles, but in winter they are frozen to a great depth.

The Great Central Highland. The greater part of southern Asia consists of a great highland and plateau area, which includes the loftiest peaks of the world. The great mountain ranges which form this highland radiate in all directions from the *Pamirs*, or "roof of the world," as they are often called, which lie in southern Turkistan. The *Hindu Kush* and the *Elburz* mountains extend to the west. The *Tian Shan*, to the east and northeast, are the beginning of the continental divide which separates the long north and west flowing rivers from the shorter streams which flow toward the south and east. This divide includes the *Altai*, *Yablonovoi*, and *Stanovoi* mountains.

FIG. 504. *In the mountainous region of the Himálayas in Tibet.*

South of this divide and east of the Pamirs lies the great interior plateau or desert region, *Gobi*, and the higher plateau of *Tibet*, the latter with an average elevation of more than fifteen thousand feet. This plateau area is bounded on the south, as on the north, by high mountains exceedingly difficult of passage, of which the most important ranges are the *Himalayas*, the highest mountains of the world. (See Figs. 503 and 504.) *Mount Everest* in the Himàlayas, with an altitude of more than five miles, the loftiest peak in the world, is surrounded by many others nearly as high. Irregular mountain ranges, some of them of considerable altitude, extend out to the east and southeast of the Plateau of Tibet, so that the larger part of eastern and southeastern Asia is mountainous. (See Fig. 509.)

In all this great highland area there is only one low pass and easy line of communication between northern and southern Asia. This lies between the Hindu Kush and the Elburz mountains. It therefore forms an important highway of commerce between Asia and Europe.

Rivers of the South and East. The great rivers of southern and southeastern Asia rise within the mountain ranges, some of them in the Plateau of Tibet, and break through these great barriers in narrow gorges, which are often difficult of passage. The most important are the *Hwang-ho* and the *Yangtse-kiang* in China, and the *Ganges-Brahmaputra* and the *Indus* in India. Each of these great streams is navigable for long distances in its lower course and is hence of great importance to the country through which it flows. At certain seasons these streams are crowded with small and large boats engaged in commerce between the coast towns and the interior. The Ganges and the Brahmaputra, which merge at the head of their delta, drain different portions of the great plain of India. The Brahmaputra and the Indus form natural highways through the great Himálayan range, and are therefore of vast importance to Tibet. (See Fig. 511.)

These rivers, as they flow out toward the sea, carry with them an enormous quantity of detritus which they have removed from near their headwaters. This detritus has been

deposited along their courses for centuries, until the rivers have built up great alluvial plains with gentle slopes and fine, well-watered soil.

With the exception of the *Amur* (see Fig. 508), which flows to the northeast into a sea frozen in winter, and the *Tigris* and *Euphrates*, which lie in an equally unfavorable dry region, all these river valleys are areas of dense population. They are the seats of some of the oldest civilizations in the world.

The Tablelands of the South. The two great southern peninsulas of Asia, *India* and *Arabia* are high tablelands, and each is separated by a low river valley from the main mass of the continent to the north. (See Fig. 503.)

The peninsula of lower India, known as *The Deccan*, is highest to the west, where the tableland rises in mountain-like peaks known as the *Western Ghats*. (See Fig. 503.) The long rivers, therefore, flow to the east toward the Bay of Bengal. The table-land on this side is low and faces the ocean in a ridge, known as the *Eastern Ghats*.

Fig. 505. *Transportation in the cold regions of central Asia.*

The table-land of Arabia, forming the greatest peninsula in the world, is high in the south and lower in the north. Lying in the heart of a great desert region, it has no rivers and is of little commercial importance. Therefore it is strikingly contrasted with the somewhat smaller peninsulas of India and Indo-China which lie in a climate favorable for dense occupation.

The Islands. Bordering Asia on the east and south is a great series of islands. Many of them are of volcanic origin, and some still contain active volcanoes. They are a part of the great volcanic rim that surrounds the Pacific Ocean. (See Fig. 69.) From Yezo southward the islands are populous and, with the introduction of European and American methods, are increasing in importance commercially.

Climate. The continent of Asia, owing to its size, has the most strongly marked continental climate in the world. Because of its great extent in latitude, the temperature ranges from the most extreme cold in the north to the excessive heat of the tropics. (See Fig. 74.) There is also a great variation in temperature in the highland areas, according to the elevation. The peaks of the Himálayas rise far above the snow line, while their foothills are covered with tropical vegetation.

The great plains and plateaus of the interior of Asia are centers from which strong winter winds blow outward, carrying cold toward the oceans. (See Fig. 82.) They are therefore very cold and dry at that season. Near the little town of Verkhoyansk in northeastern Siberia the average January temperature is 60 degrees below zero, and temperatures more than 90 degrees below zero have been recorded. This region is the coldest known place in the world, and is called the *Cold Pole*.

In summer, when the great interior region is warmed by the strong rays of the sun which penetrate the dry air, the temperature rises so that the average July temperature in places in the northern plain is more than 95 degrees Fahrenheit. (See Fig. 84.) The summer winds, blowing from the cooler ocean toward the land, are for that reason damper than those of winter, so that in summer the

interior of the continent gets a little more moisture than in winter.

On the southeast and southern coasts the winds change with the season, and are therefore *monsoons*. In summer the southeast and southwest trade winds, blowing in toward the Heat Equator, which at that time has advanced to its most extreme northern position, carry an abundance of moisture toward the interior plains of the south. At this season the climate of the southern lowlands is exceedingly disagreeable for white people and therefore the residents of the cities move to the higher hills, if possible. As the air rises it cools rapidly and excessive rainfall ensues. (See Fig. 97.) The town of *Cherra Punji*, in the southern foothills of the Himálayas, is so peculiarly situated that it has an average annual rainfall of over four hundred and ninety inches, or more than forty feet, the greatest rainfall known in the world. An amount of precipitation nearly as great as the average *annual* rainfall of New York City, which is over forty-four inches, has been known to fall in *Cherra Punji* in one day.

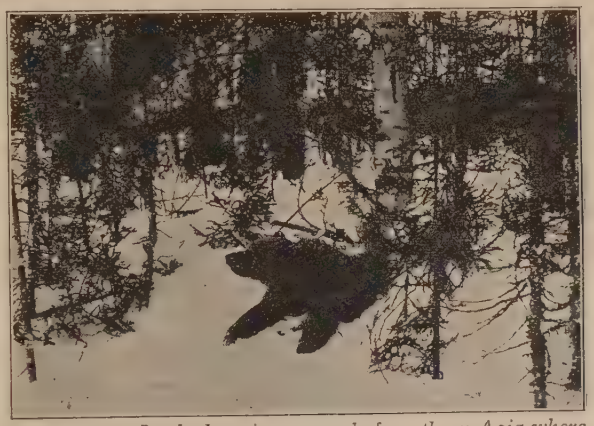


FIG. 506. *In the hunting ground of northern Asia where forests of fir abound.*

During the winter the southern and southeastern coastal areas are swept by the fair, cooling northerly trade winds, and therefore have an agreeable climate at that season.

Vegetation. The distribution of vegetation follows closely the distribution of heat and moisture. Along the northern coast is the great *tundra* belt, covered with mosses and lichens and with low bushes which bear berries during the brief summer season. On the south the tundra area merges into the evergreen forests with their larches and firs, the great hunting ground of northern Asia. (See Figs. 119 and 506.) South of the forest area is an arable region in which agriculture is now beginning to be carried on. (See Fig. 511.)

The lowland area around the Caspian Sea and Lake of Aral is a *steppe*, extending as far east as the river *Ob*. Along the coast of the Mediterranean the vegetation is similar to that in the Mediterranean region of Europe; that is, it is subtropical in its character.

The high mountains are everywhere snow-covered. The great interior plateaus of Gobi and Tibet and the tablelands of Arabia are, because of their position, part of the great desert region of the world, which extends across Africa and Asia from the Atlantic Ocean to the Pacific.

The lowland plains of southern and southeastern Asia are swept by monsoons and have an abundance of vegetation of a tropical and subtropical nature, owing to the warmth, moisture, and sunshine which abound there. In the extreme southern portion, where the conditions are tropical, jungles nearly as dense as the tropical forests of Africa and South America exist. (See Fig. 119.) The tableland of The Deccan is a great *savanna* area in which agriculture flourishes.

Animals. The animals of northern Asia are similar to those of northern Europe, because there is no mountain barrier to prevent the animals from wandering readily over the great plain area of these two continents. The animals of southeastern Asia are separated from the animals of the north by the great highland barrier over which they cannot readily migrate. Hence they are grouped by themselves to form the animal realm known as the Oriental Region. (See page 75.)

The most important wild animals of the northern tundra and forests are the reindeer, which has been domesticated, and the fur-bearing animals, which yield a large portion of the furs of the world. Throughout this area, wherever occupied, and in southeastern Asia, horses, asses, and cattle have been introduced; camels, sheep, and goats are found in great numbers in the steppe regions.

The yak has been domesticated and is extensively used as a beast of burden in the highlands of Tibet. The buffalo and the elephant have been domesticated in India, and are the only animals of the Oriental Region of any special value to man. (See Figs. 149 and 507.)

People. More than five-sixths of the vast population of Asia are found in the monsoon area, particularly in India and China. The favorable climate and the abundant vegetation in these regions enable large numbers of people to secure the necessaries of life from a small territory.

FIG. 507. *An elephant taking up a teak log in the lumbering district of Indo-China.*

The areas swept by monsoons are the most densely inhabited regions of the world, with the exception of small districts in certain large cities. The plains and highlands are almost the least thickly inhabited regions.

Three-fourths of the people of Asia belong to the yellow race, and the remainder to the white race. The white race includes the Jews, Syrians, Arabs, Hindus, and Persians. (See Figs. 518 and 519.) With the exception of the Europeans who have come into Siberia in recent years, the white race is mostly found in the southwest and south.

The yellow people are extremely varied in their characteristics and in their language. Taken as a whole they are backward in their development. The people of Japan are active, enterprising, and progressive, but their kindred of the yellow race in northern Siberia are extremely unprogressive. Nations like the Chinese, who reverence the old and dislike the new, who are conservative and self-satisfied, and have merely tolerated the presence of Europeans, have not profited from their contact with modern civilization. Other countries, like Japan, in which European customs have been adopted, or in which foreigners have been welcomed with a view to improving methods of production and trade, have made rapid advances in recent years. The same is true of India and other countries to which European colonists have gone in large numbers.

Questions and Exercises

(1) On an outline map of Asia, write the names of the surrounding oceans and their arms; also the names of the continental islands. (2) On the right-hand margin of the map write the approximate latitude of Canton and Vladivostok. (3) What towns in North America are in approximately the same latitude?

(4) Write the name of a port on each indentation; the name of the chief town on each large island. (5) When it is noon at Tokyo what time is it at Khiva? (6) Draw the meridians of these towns and write the time at each place. (7) Write in two columns the harbors of the south and east coasts.

(8) Take a sheet of paper the size of the map of Asia and draw a triangle or whatever form best represents to you the general shape of the highland region of Asia. (9) Color this a light brown and draw as accurately as you can the courses of the great streams which radiate from this highland. (10) Write the names of the rivers and draw the Arctic Circle and the Tropic of Cancer on this diagram. (11) Make a list of the rivers, grouping them according as they empty into the Arctic, Pacific, or Indian ocean. (12) Which do not reach the sea?

(13) Which great mountain ranges are crossed by rivers? (14) Which form divides? (15) Which rivers are building large flood plains? (16) How has this fact affected settlement? (17) What are the difficulties in passing from the coast into the interior by water? (18) What two rivers of China help to open up the interior to settlement? (See Fig. 503.) (19) What river valleys separate each of the southern peninsulas of Asia from the main continent? (20) Why is Arabia of less importance than India?

(21) On an outline map locate Yakutsk, Irkutsk, Khiva, Tokyo, Vladivostok, Peking, Calcutta, Singapore, and Jerusalem. (22) Write the January temperatures in one column and the July temperatures in another. (23) Which city has the greatest range of temperature? The least? (24) Why is Peking warmer than Tokyo in summer? Compare their winter temperatures. Explain. (25) Why is Lisbon cooler in summer than Peking? (26) Draw the January isotherms for zero degrees and forty degrees in one color and the July isotherms of fifty degrees and eighty degrees in another. (27) Describe the winter climate of Peking.

FIG. 508. *A village on the Amur River, Siberia. This region has long, severe winters and short, hot summers.*

LXIX. RUSSIA IN ASIA

SIBERIA

Area and Population. The Asiatic portion of the Russian Empire which includes *Siberia*, *Turkistan*, and *Caucasia* (see Fig. 509) has an area greater than that of all Europe, but a population less than that of Belgium. The population is, in part, composed of peasants and of criminals who have been deported from Russia. The larger portion of the people is found in the western part of the country, especially in the valley of the Ob-Irtysh River. The population is increasing in the valleys of the other larger rivers and along the line of the Trans-Siberian Railroad.

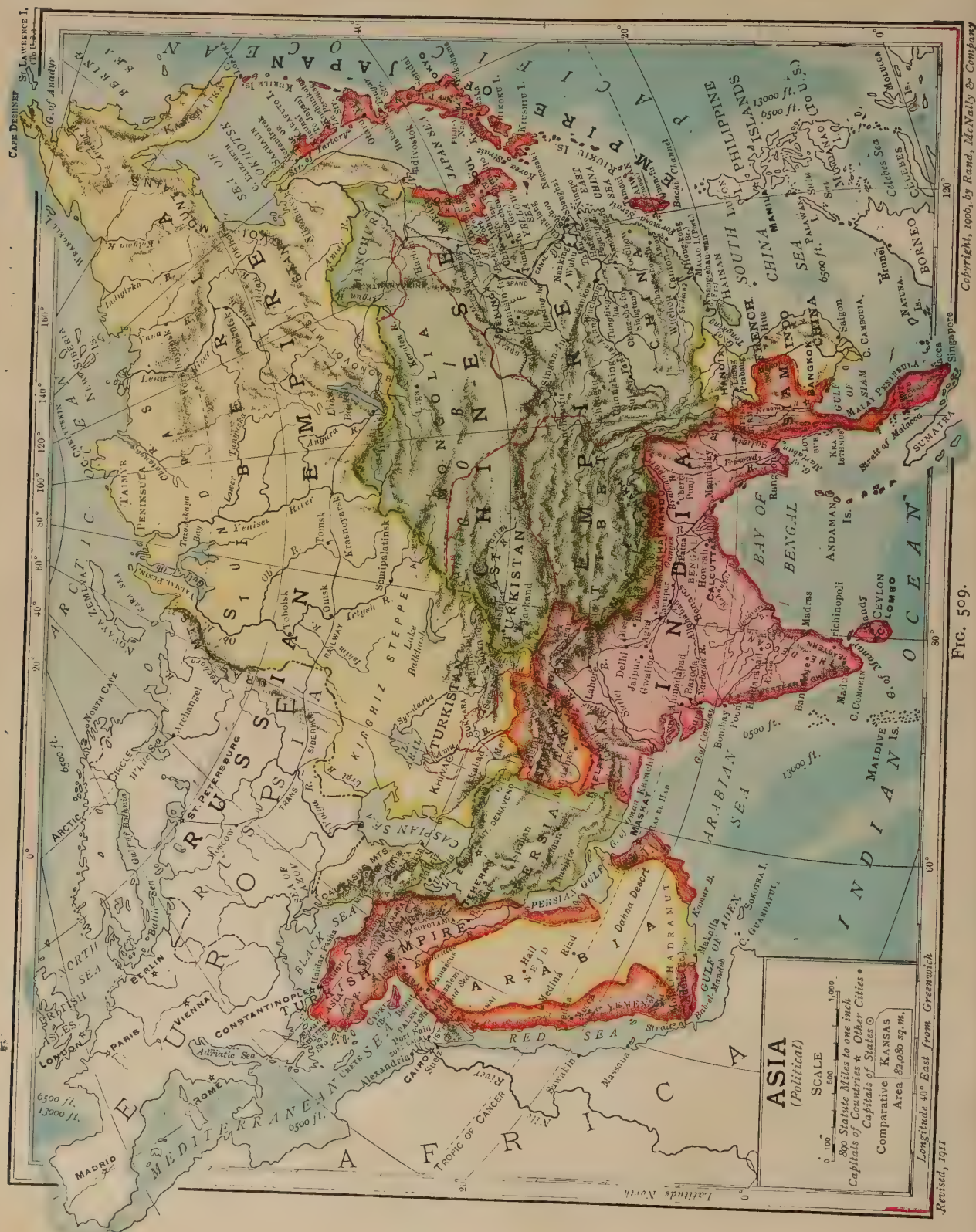
Surface. West of the Yenisei River, Siberia is flat and marshy, contains many lakes, and has a deep, rich soil. The divide between the Ob-Irtysh and the Yenisei is almost imperceptible. East of the Yenisei the country is stony and rolling, with frequent exposures of the underlying rocks. The northeast has a varied surface; the country is rolling and in many cases extremely rough.

Climate. The winters of Siberia are long, extremely cold, and very dry; the severity of the winter increases from the west to the northeast. (See Fig. 82.) The summers are short and hot, with sufficient moisture for successful agriculture in the west-central portion. The spring comes on suddenly; oftentimes not more than two weeks of spring weather intervene between the cold of winter and the hot summer with its abundant vegetation.

Western Siberia has a climate similar to that of northwestern Canada, though on the whole more favorable for agriculture. The rainfall is so slight that large areas of the country are often subjected to drought. The crops then fail and destitution follows.

Products of the Soil. The chief agricultural products of Siberia are wheat, rye, and oats, which are particularly adapted to cool climates where the summers are short. Owing to the ignorance of the farmers agriculture has been extremely backward for a long time, but now it is rapidly improving. The farmers are learning to make use of modern agricultural implements, and the new Trans-Siberian Railroad is giving an outlet for the products. At present agriculture is carried on in the steppe region as far as 62 degrees north latitude. (See Fig. 511.)

So far as timber products are concerned, the immense forests of Siberia are not of any particular commercial value on account


ASIA
(Political)
SCALE
800 Statute Miles to one inch
Capitals of Countries ★ Other Cities •
Capitals of States ⊙
Comparative Area KANSAS 82,080 sq. m.
Longitude 40° East from Greenwich
Revised, 1911
Copyright, 1906, by Rand, McNally & Company
RUSSIA
CHINA
INDIA
ARABIA
PERSIA
TURKISTAN
MONGOLIA
TIBET
JAPAN
SIBERIA
EUROPE
AFRICA
INDIAN OCEAN
PACIFIC OCEAN
ARCTIC OCEAN
MEDITERRANEAN SEA
BLACK SEA
CASPIAN SEA
RED SEA
BAY OF BENGAL
ARABIAN SEA
SOUTH CHINA SEA
PHILIPPINE ISLANDS
BORNEO
SUMATRA
MALAY PENSULA
CEYLON
FRENCH INDO CHINA
SIAM
BRITISH ISLES
TURKEY IN ASIA
EMPIRE
CAPE DEZHNEF
ST. LAWRENCE I.
Behring Sea
Sea of Okhotsk
Sea of Japan
Yellow Sea
Gulf of Tonkin
Gulf of Siam
Straits of Malacca
Persian Gulf
Gulf of Aden
Gulf of Oman
Gulf of Manaar
Arabian Sea
Indian Ocean
Caspian Sea
Black Sea
Mediterranean Sea
Red Sea
Aral Sea
Lake Baikal
Lake Balkhash
Lake Tsing Hai
Lake Tali
Lake Tonle Sap
Lake Van
Lake Urmia
Lake Tiberias
Dead Sea
Lake Hamun
Lake Hamadan
Lake Tatung
Lake Hsing Kai
Lake Dianchi
Lake Poyang
Lake Tungting
Lake Hung Tse
Lake Taihu
Lake Chaohu
Lake Hung Tse
Lake Nanyang
Lake Tai
Lake Chaohu
Lake Nanyang
Lake Tai
Lake Chaohu
Lake Nanyang
Lake Tai
Lake Chaohu

of the lack of transportation facilities. The forests are of great importance, however, because of the furs sent from them to the leading fur markets of the world, and especially to Leipzig. (See Fig. 511.)

The only product of the tundra area which is of any commercial importance is the ivory secured from the buried remains of the great hairy mammoth which formerly lived in this region. The supply, however, is being rapidly exhausted, so that the tundra gives no promise of furnishing valuable products indefinitely. (See Fig. 511.)

Mineral Products. Mineral products in some abundance are found scattered through the country. The most important are gold and silver. Gold is found in the river gravels and silver is secured from the Altai Mountains. (See Fig. 511.)

Coal, iron, lead, and copper are also found, but the coal is poor, and none of these mineral products has been developed so as to be of any considerable commercial value.

Trade. Siberia is unfavorably situated for carrying on trade. It has no open harbors except in the summer; it has no canals, few good roads, and only one great railroad; its navigable rivers are icebound the greater part of the year.

The Trans-Siberian Railway, finished in 1902, connects Russia in Europe with Vladivostok (see Figs. 510 and 511), on the Japan Sea, giving Siberia and Russia access to the Pacific Ocean. The distance by rail from St. Petersburg to Vladivostok is about 5,633 miles. Passenger trains cover the distance in about two weeks; freight trains require a longer time. More than one-half the freight carried over this road is grain; the rest is largely animal products and tea. Tea is transported over the land westward from Asia to Europe because it has been found that "overland" tea is superior to tea carried by water. During a sea voyage tea absorbs moisture and loses its flavor.

The only towns of any considerable size in Siberia are *Tomsk* and *Irkutsk*, both of which have a population of more than fifty thousand and are centers for the local government.

FIG. 510. *Vladivostok, the terminus of the great Trans-Siberian Railway.*

TURKISTAN

Situation and Surface. Turkistan lies to the west of China and north of India, Afghanistan, and Persia. Its surface, consisting of plains in eastern Turkistan and of high plateaus in the Pamirs, is very rugged. Most of the country, owing to its position, is either a desert or a steppe. The population therefore is extremely scanty, and the chief occupation is grazing.

Products; Cities. The products of Turkistan are not specially important. Millet, maize, rice (see Fig. 512), and flax are raised under irrigation, largely for home consumption, and some cotton is raised for export.

The only towns of any size are irrigated

ASIA
(Commercial)
SCALE
Principal Products
Navigable Portions of Rivers
Most important Railroads
Most important Steamship Lines
Longitude 40° East from Greenwich
Revised, 1911
Copyright, 1915, by Rand, McNally & Company.
RUSSIAN EMPIRE
BRITISH EMPIRE
CHINESE EMPIRE
JAPAN
PERSIA
TURKISTAN
AFGHANISTAN
INDIA
EUROPE
AFRICA
ARCTIC OCEAN
INDIAN OCEAN
PACIFIC OCEAN
MEDITERRANEAN SEA
BLACK SEA
CASPIAN SEA
RED SEA
ARABIAN SEA
BAY OF BENGAL
SIBERIA
MONGOLIA
TIBET
SIAM
CEYLON
BORNEO
SUMATRA
PHILIPPINE IS.
LONDON
PARIS
BERLIN
VIENNA
ROME
MADRID
CONSTANTINOPLE
CAIRO
CALCUTTA
BOMBAY
MADRAS
PEKING
TOKIO
SINGAPORE
SUEZ CANAL
TROPIC OF CANCER
Latitude North

FIG. 511.

oases like *Merv*, *Khiva*, *Bukhara*, *Samarkand*, and *Tashkend*. These centers are connected by a railroad; it is the only one in this portion of the country, and is therefore of considerable importance. In time of war or of threatened trouble, Russia could quickly transport a large force to the Afghanistan frontier of India by means of this railroad.

CAUCASIA

Situation and Surface. Caucasia includes land on both sides of the Caucasus Mountains. It is a country of mountains and tablelands, with rich valleys lying between.

FIG. 512. *Breaking rice in southern Turkistan.*

Products. The climate and soil of the valleys favor grapes, corn, and cotton. Petroleum and manganese are found in large quantities, and are the chief natural resources of the region. In fact, Caucasia furnishes more than one-third of the world's supply of petroleum. (See Figs. 511 and 513.)

Cities. *Tiflis* is the principal town, but *Baku*, in the Caspian petroleum field, is rapidly pushing to the front on account of the development of the oil industry. Both cities are situated in the great valley between the two chief ranges of the Caucasus Mountains. From the earliest times this valley has been the great highway of commerce between the Caspian Sea and the Black Sea. It is now traversed by a railroad which connects at Baku with another line extending from central Russia round the eastern end of the mountain system. (See Fig. 511.)

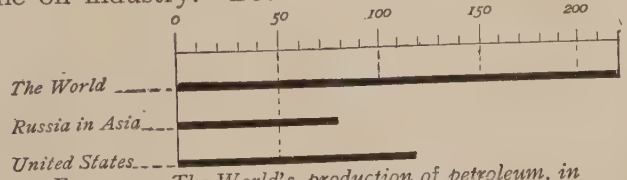


FIG. 513. *The World's production of petroleum, in 1904, in millions of barrels.*

Questions and Exercises

(1) On an outline map write the chief products of Siberia. (2) Draw the Trans-Siberian Railway and locate chief towns on the road. (3) Write the names of the chief products carried by the road. (4) Tell something which you have read at home about life in Siberia. (5) Locate the railroad which connects Baku with Tashkend and name the cities on the line. (6) Of what importance to Russia is this road? (7) How does oil from Baku reach St. Petersburg? (8) Where are the irrigated portions of Turkistan? The grazing regions? (9) Why are Lake Aral and the Caspian Sea salt? (10) Mention features of this region similar to those of the Great Basin in North America. (11) Why do the streams flowing into Lake Aral come from the east? (12) What time is it at Khiva when it is noon at Greenwich? (13) Compare the latitude of Khiva with that of Salt Lake City, Utah.

LXX. ASIATIC TURKEY

Surface and Climate. Asiatic Turkey includes *Asia Minor*, *Mesopotamia*, *Syria*, and *Palestine*, and wide strips of coast in Arabia. (See Fig. 509.) A large part of the area is a tableland three thousand feet high. The only important lowland is the *Tigris-Euphrates* valley, forming what is known as Mesopotamia. Owing to the location the rainfall of the region is scanty except on the hill slopes facing the sea. The air is clear and dry, hence the daily and the annual range of temperature is great. The desert-like character of much of the country confines the people to pastoral occupations except in the irrigated regions.

ASIA MINOR

Products. Asia Minor is mostly arid, but along the coast, where irrigation is carried on, crops peculiar to the shores of the Mediterranean are raised. The character of these is indicated by the exports from *Smyrna*, the chief town. These exports, in the order of their commercial value, are raisins, cotton, opium, figs, barley, licorice, carpets, wool, and sponges.

Sponges are secured from the Ægean Sea, and the wool is mainly from the Angora goats. Oranges, which thrive in similar latitudes elsewhere, are not produced here in any quantity, owing to the severity of the winters.

Transportation and Trade. Asia Minor has but few good highways, although it contains the remains of many fine old roads built in the time of the Romans. Railroads are now being built, and in the course of time there will probably be a complete line from Haidar Pasha, opposite Constantinople, to the Persian Gulf. This railroad will undoubtedly be of great strategic and commercial importance when the country along its route is developed and becomes so rich that the great nations will join in its protection, as they have joined in the protection of China.

At the present time most of the interior transportation is carried on by means of horses and cattle. *Trebizond*, a port of increasing importance on the Black Sea, is the terminus of an important caravan route through Mesopotamia and northern Persia.

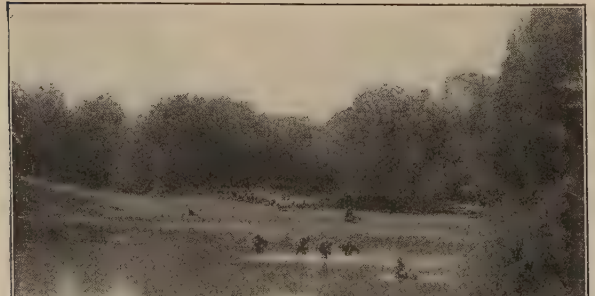


FIG. 514. *A view of the Jordan River, Palestine. Shepherds crossing the river with their flocks.*

SYRIA AND PALESTINE

Surface and Climate. Syria is a country of great historic and religious interest. It consists of a narrow coastal plain, somewhat wider to the south than to the north, and bordered on the east by two abrupt ranges of mountains. These mountains are covered with forests, and between them lies the wonderful depression containing the *Jordan River* (see Fig. 514) and the *Dead Sea*.

The Dead Sea is 1,290 feet below sea level and its waters are very salt. The climate of this depression is warm and dry, indeed almost tropical in summer.

East of the mountain ranges is a high plateau which extends into Arabia. With the exception of the irrigated portions and the fertile plains of the Mediterranean coast, Syria is generally dry. (See Fig. 97.) On the great plateaus of eastern Syria grazing is carried on, not only as extensively, but in practically the same way as in the time of Christ.

FIG. 515. *The city of Beirut.*

Products. The chief products of Syria are silk, tobacco, and oranges. Soap-making is a local industry in certain regions. The soap oil is made from olives, and the soda required in the process comes from certain plants which grow in the salty soil.

Cities. *Beirut*, connected by rail with *Damascus* (see Figs. 515 and 516), is the chief

port of Syria. Damascus produces cloth, leather, and inlaid work, noted for centuries for their fine quality. It is important historically and is the terminus of caravan routes from Arabia and the East.

Jaffa is the port of *Jerusalem*, and is connected with that ancient city by a railroad. The whole country is of great interest to all who profess the Christian, Jewish, or Mohammedan religions, and Jerusalem in particular is a holy city to all these sects.

FIG. 516. *Damascus. A stopping place for pilgrims on the way to Mecca.*

The principal city of Arabia is *Mecca*, near the west coast. Mecca is the birthplace of Mohammed and the holy city to all Mohammedans, every one of whom during his life must make at least one pilgrimage to the sacred temple there.

In the extreme southwest of Arabia on the Gulf of Aden is the British port of *Aden*, which controls the narrow and important southern approach to the Red Sea. (See Figs. 511 and 517.) It is one of the strategic points guarding the United Kingdom's sea route to India. The fortifications at Aden are built in an extinct volcanic crater, the rim of which is more than 1,700 feet above the sea. The country roundabout does not produce sufficient food for the garrison and furnishes no firewood, so that both these necessaries have to be imported. Water for drinking is secured by distilling the sea water.

ARABIA

Surface and Climate. The great desert table-land of Arabia receives rain only in the southwest in the province of Yemen, and in the southeast in the independent state of Oman. These two places have a limited rainfall in spring and autumn, and certain crops can be grown, of which the leading ones are coffee, subtropical fruits, and vegetables.

Products; Cities. The interior of Arabia is of some importance because of the horses, camels, and dates which are produced there. Arabian horses are known the world over for their beauty and intelligence.

FIG. 517. *The harbor and native city of Aden, with a group of natives in characteristic posture.*

MESOPOTAMIA

Soil and Climate. Owing to the general use of irrigation, the low-lying plain of Mesopotamia was formerly very rich, but the government of this region, like that of most of Asia Minor, has been so poor that the prosperity of the

country has been allowed to decline. The climate is so very hot that in summer the people live in underground chambers, which are much cooler than houses would be.

Products; Cities. The only products for export are cereals, dates, wool, gum, and hides. Mules and camels are raised in great numbers. Many of the products of subtropical countries which might be produced at home are imported. Inland communication is carried on by means of camels and river boats.

Bagdad, at the head of navigation on the Tigris, is the chief town, but is not so important as it formerly was. It is on the line of the proposed railroad to the Persian Gulf, and will recover its lost position when that road is built.

FIG. 518. *A group of Bedouins, or nomadic Arabians.*

Questions and Exercises

(1) Where are the lowlands of Asiatic Turkey? (2) Which is below sea level? (3) Point out the mountain slopes which receive the most rain. (4) What kind of a coast line has Asia Minor? Syria? Arabia? (5) Which is best situated for carrying on commerce? (6) What mountain peak in the northern part of Asia Minor? In the peninsula of Suez? (7) For what is the latter famous? (8) To what country does it belong?

(9) Write the following cities in one column, their location in a second, and in a third some fact, either geographical or historical: Smyrna, Jerusalem, Damascus, Mecca, Bagdad. (10) What river in Asia Minor has given us a name, now applied to all similar streams? (11) Why is the possession of Aden important to the United Kingdom? (12) What other fortress does the United Kingdom control on the same great trade route? (13) Mention as many reasons as you can why Asia Minor and Syria are unprogressive.

LXXI. PERSIA, AFGHANISTAN, AND BALUCHISTAN

PERSIA

Surface and Climate. Persia, a country as large as France, England, and Germany, occupies the *Plateau of Iran*. Owing to its position and surface, it is very dry, except on the mountains, where some rain and snow fall in winter.

Products and Trade. In the valleys and along the Caspian Sea, the only fertile regions, cereals and fruits are grown. Products of value in addition to these are carpets, rugs, and shawls made from the wool of the mountain sheep and goats, and brass work. These products, together with opium, raw silk, cotton, and horses, are sent in trade to Europe, and especially to Russia. Commerce is carried on by boats over the Caspian Sea and by caravan to Trebizond. The leading imports are calico and cotton cloth—the characteristic imports of hot regions in which manufacturing is not well developed and which therefore are dependent upon other more favored countries for many of the necessaries

AFGHANISTAN AND BALUCHISTAN

Surface and Climate. Afghanistan is a mountainous country, rising above the plateau of Iran and extending to the great highlands of the Pamirs. (See Fig. 509.) Owing to its altitude and location, the climate, like that of the rest of western Asia, is dry. In the lower valleys, however, some agriculture is carried on.

Baluchistan is an arid, unproductive region under the control of the British government. It is mostly made up of tablelands.

Products and Trade. Where the climate is favorable, as it is in the valleys, cereals, apples, and the vine are grown. Cattle, goats, and camels are raised in the colder, higher altitudes. The only trade route of any significance is from *Herat* to the Caspian Sea, although the caravan route through the *Khaibar Pass* is of some importance on account of the overland trade with India.

Questions and Exercises

(1) Why do Persia, Afghanistan, and Baluchistan receive so little rain? (2) What influence does the mountain rim around the Iran Plateau have upon its rainfall? (3) Trace the trade route from Trebizond to India. (4) Why is this route important? (5) To what European country would its possession be of immense advantage? (6) For what products is Persia best known in America?

FIG. 519. *A group of dancing Dervishes in Persia.*

LXXII. INDIA

Position and Population. The Empire of India, one of the most important colonies of the British Empire, occupies the great peninsula of southern Asia and extends on the north to the Himálayas. (See Fig. 509.) It is nearly one-half as large as Europe, and contains approximately one-fifth of the people of the world. Its population is mostly of the white race, either Hindus or Europeans, but the English language is spoken by few except those from Europe. The Hindus (see Fig. 525) are divided among many races, and speak more than a hundred different languages.

Surface and Drainage. India is bounded on the northwest, north, and northeast by tablelands or very high mountains. (See Figs. 503 and 520.) The peninsula portion is a plateau or tableland, varying in altitude from 2,500 to 1,500 feet, with a narrow coastal plain bordering the Eastern Ghats.

The tableland is separated from the foothills of the high mountains of northern India by the great plain occupied by the *Indus* and the *Ganges-Brahmaputra*. This plain is from 150 to 300 miles wide, and contains the densest population and the most important commercial districts of southern Asia.

Coast Line. The coast line of India is very regular, and consequently permits of few good harbors except for a distance up the rivers or behind a sheltering barrier of islands, as at Bombay. The southern portion of the westen coast is bordered by barrier beaches and lagoons which are of great importance in commerce for the protection they offer to vessels during the season when the southwest monsoon causes high breakers on the shore.

Climate. The climate of India is that always found in a district swept by monsoons. In winter from November to February, when the northern trade winds blow, the climate is dry and cool. In the rainy season, lasting from June to October, when the southern trade winds prevail, the climate

is warm and extremely wet. Before the beginning of the rainy season, and yet after the influence of the spring sun has begun to be felt, from March to May, the climate is hot.

The rainfall is heaviest in the *Western Ghats*, on the Khasi hills about Cherra Punji and the hills of *Upper Burma*, and in the delta of the *Ganges*. The rain in the rainy season comes in bursts; an enormous downpour often falls in but a few minutes. In the moist, warm region of the lower Ganges, where the climate favors a rapid growth of vegetation, the population is more than four hundred to the square mile; that is, as dense as is the population in Rhode Island, the most densely populated state in the Union.

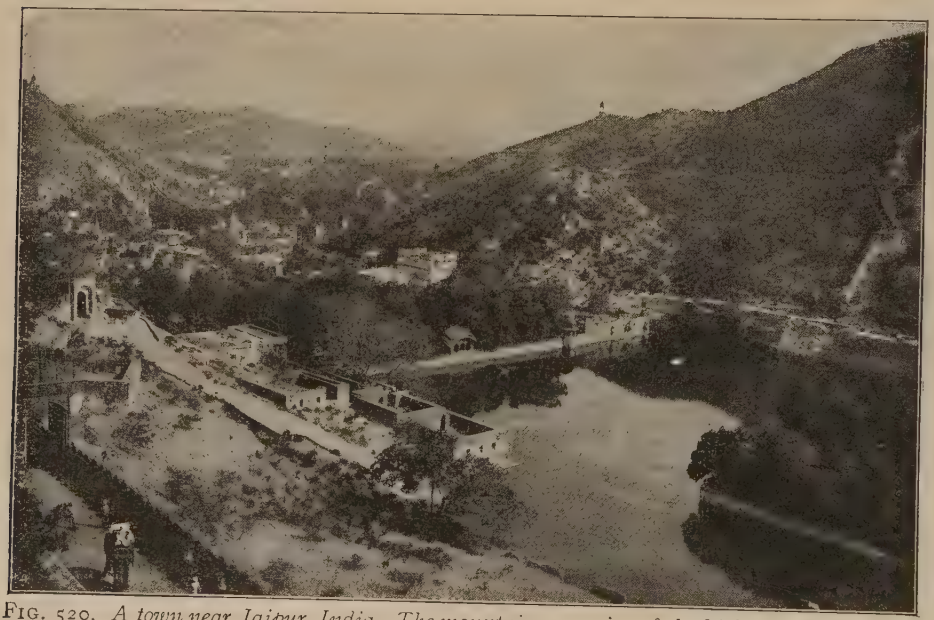


FIG. 520. *A town near Jaipur, India. The mountainous region of the high plateau is shown.*

The valley of the Indus is almost rainless, owing to the fact that the southwestern trade winds have passed over so small an area of water that they have not become sufficiently saturated to produce rain when they strike the warm lowland. When the rainfall is deficient in this region, crops fail and famine ensues. The rainfall in the Eastern Ghats is about a third or a fourth of that of northern India, and comes in the cool season when the northeasterly trade winds, crossing the Bay of Bengal, carry moisture to the land.

Canals and Irrigation. Throughout India, except in the lower Ganges and in the upper stretches of the rivers of The Deccan, extensive canals have been built to carry water from the rivers to the land where it may be used for irrigation. In 1901 there were more than 42,000 miles of these canals in India, many of which are also important as routes of trade. On The Deccan and in the plains about Madras the rain of the rainy season is caught in tanks which have been built in the ground, and is used for irrigation during the dry season.

Vegetation. Every form of vegetation, from the desert flora of the northwest to the tropical jungle growth of the extreme southeast, is found in India. (See Figs. 119 and 521.) The plains are practically treeless, but they support a heavy vegetation. In the foothills of the Himalayas are forests of oak which merge into rhododendron thickets in the higher altitudes. On the still higher slopes are immense coniferous forests, while above 19,000 feet glaciers and permanent snow prevail. The principal lumber product of value is the teakwood, a very hard and durable timber found in the forests of The Deccan. (See Fig. 511.)

Products of the Soil. Owing to the favorable climatic conditions and to the richness of the soil in the great plains and on The Deccan, agriculture is the leading occupation of the people of India. (See Fig. 511.) In

FIG. 521. *A road cut through a banyan tree along the Ganges River, India, showing the luxuriant vegetation.*

the irrigated regions two crops a year are harvested, one in October and one between January and March. Northwestern India, which has a winter climate as cool as southern Europe in summer, raises wheat and barley. Most of the crop is consumed at home, though some of it is exported at times.

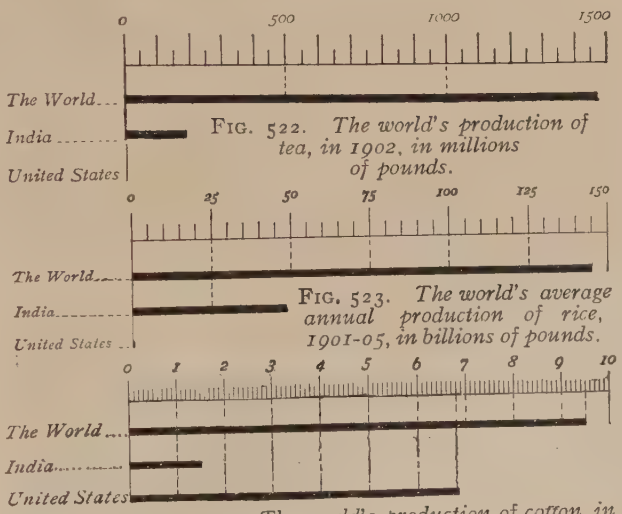


FIG. 522. *The world's production of tea, in 1902, in millions of pounds.*

FIG. 523. *The world's average annual production of rice, 1901-05, in billions of pounds.*

FIG. 524. *The world's production of cotton, in 1905, in billions of pounds.*

The most important crops of India are rice, wheat, millet, and other cereals, and oil seeds, like linseed, castor beans, and mustard, and tobacco, and jute. Opium is produced abundantly in central India, and cotton is raised on the black lava soil of The Deccan. In the flooded lowland districts rice is the leading crop; it forms the principal food of the people of that region, yet ranks third among exports. Tea is one of the principal crops of the foothills of the Himálayas and of southwestern India, and indigo is raised in the Ganges valley and in the eastern lowlands. (See Figs. 511, 522, 523, 524, 582, and 584.)

Minerals. India is rich in minerals, especially coal, iron, copper, and gold, but the coal is poor and the smelting of iron is therefore costly. Hence the minerals are but little worked. Salt is produced by evaporating the water of the lakes of the interior regions of the west; it also occurs in the form of rock salt in northwestern India.

Manufacturing. India was formerly famous for the weaving of fine silks, muslins, shawls, carpets, and rugs, also for its ivory, gold, silver, and copper articles. These goods are still produced, but owing to the introduction of modern machinery and cheap dyes, and to certain other conditions, the quality is not so good as it once was.

The only manufactures of any importance are cotton, paper, and jute. Bengal and Bombay are the manufacturing localities.

Trade; Cities. India has an immense trade, especially with the United Kingdom, its sovereign country. It is more than a third of the trade of the whole continent. (See Fig. 526.) The chief

FIG. 525. *Hindu pilgrims at a bathing place on one of the sacred streams. The picture shows a religious ceremony.*

exports to the United Kingdom are tea, wheat, jute, oil seeds, rice, cotton, and indigo. Opium is sent to China. The imports are largely provisions and manufactured goods, such as cottons, yarns, and machinery. Foreign trade is centered chiefly at Calcutta, Bombay, Madras, and Karachi.

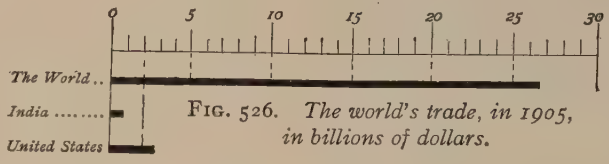


FIG. 526. *The world's trade, in 1905, in billions of dollars.*

Calcutta, on the Ganges, is situated lower down the stream than the earlier ports which sprang up on this river, owing to the filling up of the lower channel. The harbor is kept open only by costly engineering works. Calcutta, the chief trade center for the products of the Ganges, is the seat of the Indian government. (See Fig. 527.)

FIG. 527. *The harbor of Calcutta. The foreign steamers are being loaded from the small native boats clustered in the foreground.*

Bombay, with a fine protected harbor, is situated on an island off the west coast of India. (See Fig. 509.) Owing to the recent development of the railroads over the mountains, it has been brought into close touch with the producing areas of central India, and now rivals Calcutta in the importance of its trade.

Karachi has an artificial harbor which cannot be used by large vessels during the southwest monsoon. It has ready access to the wheat-producing country, and hence has an important trade.

Madras, also with an artificial harbor, lies in the midst of the rich plains of lower India, and is the fourth in rank among the ports of that country.

Of the interior towns, *Srinagar*, in the beautiful valley of Kashmir, is the most important. Through this town pass the shawls, wool, borax, and precious metals of the northwestern province, destined for India. It also has an important trade with East Turkistan, carried on by caravans (see Fig. 505) over the *Karakoram Pass* at an altitude of 18,500 feet, the highest pass in the world occupied as a trade route.

NEPAL AND BHUTAN

On the southern slopes of the Himálaya Mountains are the two small independent principalities, *Nepal* and *Bhutan*.

Questions and Exercises

(1) Draw a sketch map of India and write the names of its land and water boundaries. (2) Color the lowland portions and draw the Ganges, Brahmaputra, and Indus rivers. (3) Why does the Ganges receive more tributaries from the north than from the south? (4) What problem does the Ganges-Brahmaputra present to the people living in its valley? (5) What river in North America presents similar problems? (6) Compare the location of Calcutta with New Orleans. (7) Why should

the Indus Valley be so much less densely populated than the Ganges? (8) Compare in length and character the rivers of the east and west slopes of The Deccan.

(9) Compare the average height of The Deccan and the Appalachian Highland. (10) How have the Himálayas been a protection to India? (11) What is the only important gap leading from the west into India?

(12) On the map used in Exercise 1 draw the Heat Equator for January and July; draw arrows to indicate the direction of the winter monsoons; summer monsoons. (13) Write in figures on the map the yearly rainfall of Calcutta, Delhi, Madras, and Bombay. (14) Why does the southeastern coast of The Deccan receive rain from the northern trade winds? The northwest coast from the summer monsoons? (15) For what is the Indus chiefly important? (16) Why is the health resort of Simla located in the hills? (17) Draw a second sketch map and write the chief products, underlining those which are exported either in a raw or manufactured state. (18) What are the staple food products? (19) What contrasts in farming would you expect between India and the United States?

(20) Where is the population of India most dense? Least dense? (21) Of what advantage to England is the possession of India? (22) On the second sketch map locate Calcutta, Bombay, Madras, Karachi, and Srinagar. (23) Draw railroads connecting Bombay with the Ganges Valley. (24) Why is Bombay a more important port than Madras? (25) Account for the location of Karachi. (26) Why is not tea sent overland from India to Europe as it is from China? (27) How would tea from India reach New York City? San Francisco? (28) Why is the commerce of India so largely with the United Kingdom?

LXXIII. CEYLON

Size and Situation. Ceylon is about half the size of England, and is separated from southern India by a narrow strait. This strait is so shallow that vessels from Madras to the west coast of India or to the Red Sea have to go around the island. (See Fig. 503.)

FIG. 528. *Plowing in the rich agricultural region of Ceylon.*

Surface and Climate. The southern half of Ceylon is extremely mountainous, while the northern half is a low, flat plain. The southwestern portion, because of its mountains, receives the moisture carried by both the southwest and the northeast monsoons. Agriculture can therefore be carried on successfully, and the densest population on the island is found here. (See Fig. 528.)

The northern plains are too low to receive any moisture from the winds which sweep over them, and for that reason receive little rainfall at any time during the year. They are covered, however, by ruins left by ancient people, showing a former dense population.

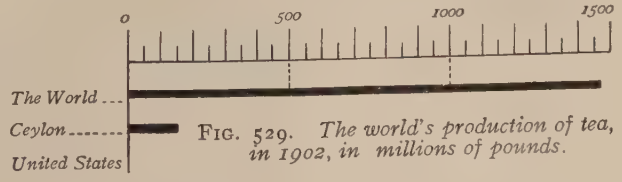


FIG. 529. *The world's production of tea, in 1902, in millions of pounds.*

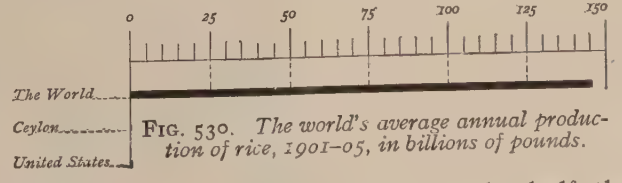


FIG. 530. *The world's average annual production of rice, 1901–05, in billions of pounds.*

Productions and Trade. The mountains of Ceylon are occupied largely by Europeans engaged in operating tea plantations, which have in recent years replaced coffee. Tea growing is the chief occupation, and tea forms nearly half the exports. (See Fig. 529.) The lower plains and the hills with a warmer, more moist climate are devoted to rice (see Fig. 530) and cocoanuts. Pearl fisheries

FIG. 531. *A general view of Kandy, an interior city of Ceylon.*

are, as a rule, profitable in the *Gulf of Manar*, but the returns are uncertain. The trade is largely with India and the United Kingdom.

Colombo is a calling port for vessels plying between Europe and the Far East by way of the Suez Canal. Connected by rail with the hill plantations, it has ready access to the areas furnishing the leading exports. In the interior, near large and attractive botanic gardens, is *Kandy* (see Fig. 531), the old capital.

Questions and Exercises

(1) Draw a map of Ceylon showing the continental shelf connecting it with India. (2) Locate Colombo and draw the ocean route between Madras and the west coast of India. Show the trade route leading from Colombo to the west and the east.

LXXIV. INDO-CHINA

The Peninsula as a Whole. Indo-China, sometimes called Farther India, includes *Upper* and *Lower Burma*, *French Indo-China*, *Siam*, the *Malay States*, and the *Straits Settlements*. The peninsula extends to within ninety miles of the equator. It is narrow and low at the *Kra Isthmus*, which is situated at 10 degrees north latitude. A canal, which has been proposed across this isthmus, would greatly shorten the distance by water between the eastern coast of Asia and Europe.

Surface and Climate. Indo-China is a plateau crossed by range after range of mountains extending north and south, one of these running out to form the Malay Peninsula. Low plains exist in French Indo-China and in the valley of the Iráwadi. The climate is everywhere tropical, with a heavy rainfall, which gives a luxuriant vegetation, especially in the Malay Peninsula where dense jungles exist. (See Figs. 119 and 503.)

BURMA

Products. The Iráwadi River valley lies between higher lands covered with teak forests, and is extensively planted with rice. Burma exports more teak than any other country. There are few roads, and most of the transportation of goods is carried on by means of oxen and elephants.

Rangoon, the outlet for the trade of the Iráwadi Valley, is the chief port, and is accessible at high tide to large, ocean-going vessels. Rubber, petroleum, coal, gold, and rubies, together with teakwood, are the chief exports. The rubies found here are the finest in the world. Burma is a part of the Empire of India.

MALAY PENINSULA AND STRAITS SETTLEMENTS

Products; People; Cities. The products of the Malay Peninsula are all tropical in nature

FIG. 532. *A native house in the spice country of the Malay Peninsula.*

and include rice, cotton, sugar cane, sago, gums, and spices. However, tin, found in great abundance, is the leading product.

The people of the Malay Peninsula (see Fig. 532) are mostly Malays, or brown people; they are closely related to the yellow people.

The chief cities of the Malay Peninsula are *Malacca* and *Singapore*. (See Fig. 533.) Singapore is a coaling port for vessels plying between Europe and the Far East. It is a great shipbuilding center with large shipyards, and is near the largest tin-smelting works in the world. The Straits Settlements, which occupy the lower part of the Malay Peninsula, are a part of the British Empire, and give the English control of the Strait of Malacca. Next to India, they have the largest commerce of any country in southern Asia. (See Fig. 534.)

FIG. 533. A suburban street near Singapore, giving a good idea of the tropical vegetation.

SIAM

Products; Cities. Siam is an independent country. The only cultivated areas are the delta and the river banks of the Menam River, which are devoted to rice. Teak grows in the higher hills, and gold and tin are mined in considerable quantities. *Bangkok* is the chief port and town, but it has a poor harbor, owing to the presence of sand bars, and its commerce is unimportant. Siam is not so progressive as India.

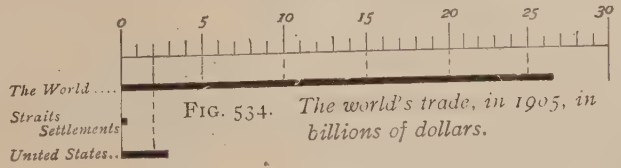


FIG. 534. The world's trade, in 1905, in billions of dollars.

FRENCH INDO-CHINA

Products; Cities. French Indo-China, a dependency of France, is much like Siam in products and climate. *Hanoi*, the capital and *Saigon*, situated in the delta of the Mekong River, are the chief towns.

Questions and Exercises

(1) On an outline map write the names of the land and water boundaries of Indo-China. (2) Show by a dotted line the effect of the proposed canal at the Kra Isthmus.

(3) What is the chief food of the people of Burma? (4) How is the climate and soil fitted to raise this grain in such quantities? (5) To what point is the Iráwadi navigable? (6) Account for the location of Mandalay and Rangoon.

(7) To what country does the Straits Settlements belong? (8) What great highway does Singapore control? (9) Name three great ocean gateways in Europe and Asia controlled by the United Kingdom. (10) What does Singapore receive? (11) What does it distribute? (12) On the map used in Exercise 1, locate Bangkok and Singapore.

LXXV. THE CHINESE EMPIRE

Position and Climate. The Chinese Empire is more than half as large as the whole of North America. It includes *China, Manchuria, Mongolia, East Turkistan,* and *Tibet.* It lies on the eastern coast of the great continent of Eurasia, and from its great extent has a wide range of climate. The

winters are cool in the south, cold and rigorous in the north and in the interior, with desert conditions on the high plateaus of Tibet, Turkistan, and Mongolia.

Owing to the great size of the continent and to the extremely low continental temperatures which prevail in the interior in winter, cold climates extend farther south on the east coast than they do in the corresponding part of North America. The southeastern coast lies in a region swept by monsoons and receives abundant rainfall in winter when the winds blow from the sea.

FIG. 535. *An old stone arched bridge on a highway crossing Ta-hu Lake, China. Notice the seven-story pagoda in the distance.*

Surface and Drainage. A large part of the Chinese Empire is extremely mountainous and very thinly populated. The most important portion is the group of river plains along the eastern coast. (See Fig. 503.) Here the densest population is found. The water gaps, where the rivers cross the mountain ranges, are narrow and very difficult of passage, owing to the rapids. These rapids have been a great barrier to interior trade.

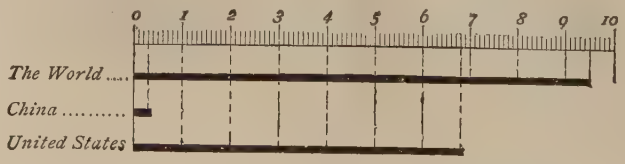


FIG. 536. *The world's production of cotton, in 1905, in billions of pounds.*

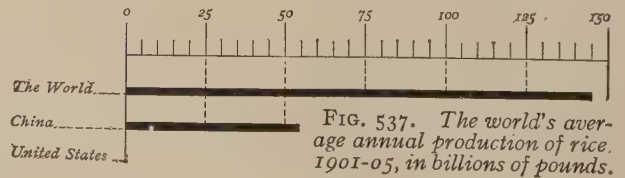


FIG. 537. *The world's average annual production of rice. 1901-05, in billions of pounds.*

In spite of the mountains, the Yangtse-kiang is navigable for a thousand miles, and ocean-going vessels can reach Hankow, six hundred and eighty miles up the river. The *Hwang-ho*, or *Yellow River*, sometimes called "China's Sorrow," flows in its lower portion across a very flat, alluvial plain. This plain is so level that the river, which is not forced to follow any particular channel, often changes its course. It formerly flowed into the Yellow Sea, but now empties into the Gulf of Pechili. It is subject to floods, which often do immense damage to both life and property.

CHINA

Population. China is the most important of the several divisions of the Chinese Empire. It is very densely inhabited, and contains nearly five-sixths of the population of the entire country. Most of the people belong to the yellow race.

Surface and Climate. Southern China is mountainous, contains no plains, and has an extremely rugged coast. The harbors are excellent, but are difficult of access from the interior, so that oceanic commerce is imperfectly developed. The climate is tropical or subtropical, with wet and dry seasons. Northern China has a low and sandy coast with few harbors.

Products of the Soil. Tea, silk, rice, sugar cane, opium, and cotton are the most important products of the soil. Rice is grown wherever possible, and forms the chief food of the

people. In southern China the mountains are covered with heavy forests in which mulberry trees thrive. The raising of silkworms, which feed upon the mulberry, is the most important industry. Tea is grown in the west and south; and sugar and cotton in the south. (See Figs. 511, 536, 537, 538, 539, 574, and 578.)

In northern China the soil is mostly made of detritus blown by the winds from the deserts farther inland and brought down by the rivers. This soil is very fine and yellow. It is easily blown about, and everything it rests upon is yellow like the ground; in fact, this portion of the country is sometimes called "The Yellow Kingdom." The soil is fairly fertile, but irrigation has to be employed in order to raise crops, and wells dot the country as they do in India. Pigs, poultry, and dogs are to be found almost everywhere.

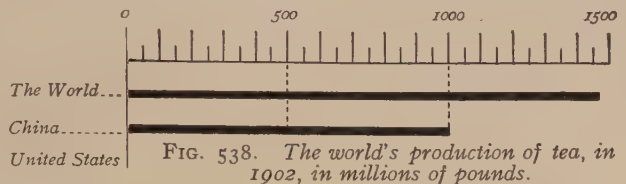


FIG. 538. *The world's production of tea, in 1902, in millions of pounds.*

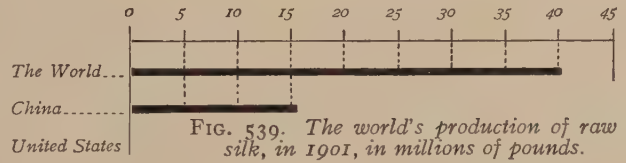


FIG. 539. *The world's production of raw silk, in 1901, in millions of pounds.*

Mineral Products. The mineral deposits of China are especially valuable. China is the only country having coal fields rivaling those of the United States, but owing to the backwardness of the people, little coal has been mined. The chief mineral products are iron and pottery clay.

Manufacturing. Owing to the fact that the Chinese have not kept in touch with modern methods of business and have not made use of their abundant natural resources, manufacturing is only slightly developed in China, and is mostly done by hand. Silk, cotton, paper, and porcelain goods are the leading manufactured products.

Transportation. Interior communication in China is poor except over the plains and along the main waterways. There are few highways (see Fig. 535) and fewer railroads. The building of railroads, at first opposed by the government, is now encouraged, and railroads are increasing rapidly, especially about Peking.

The interior trade is largely carried on by caravan. The Grand Canal, extending from Tientsin-fu to the Yangtse-kiang, a distance of seven hundred miles, makes it possible for the products of the plains to be brought to the sea.

Cities. The principal trade of China with foreign countries is carried on at the "treaty ports," that is, ports opened to foreign trade, and which are the only places where foreign vessels are allowed to load or discharge their cargoes. These ports now include nearly all river and coast towns.

FIG. 540. *The busy "treaty port" of Tientsin-fu.*

Shanghai, at the mouth of the Yangtse-kiang, is the largest industrial city, and the only good port on the northern coast.

Hong-kong, on an island near the mouth of the Canton, a British possession since 1842, is the most important port except Shanghai. Steamers run daily between the port and the populous city of Canton. (See Fig. 541.)

Hankow is an active river port. *Tientsin-fu*, the port of Peking, has a poor harbor, but is the treaty port of northern China. (See Figs. 511 and 540.)

Peking, the capital, is the best known city, and as the seat of government is in many ways the first city of China. Because it is practically the gateway to both Mongolia and Manchuria, it is of great strategic importance.

Trade. China ranks third in commerce among the Asiatic nations. Most of its trading is with the British port of Hong-kong, Japan, the United Kingdom, and the United States. The chief exports of China are characterized by great value in small bulk. China is the leading country of the world in the production of raw silk, and exports large quantities of tea, most of which is carried overland. The tea industry has declined in recent years, owing to the development of the tea plantations of India and Ceylon. Yet China still exports more than twice as much tea as India, the next greatest tea-producing country of the world. The principal imports are cotton and opium. The chief export to the United States is tea. Our country supplies China with a large part of its cotton goods, and with some wheat and flour. Regular lines of steamers ply between the United States, China, and Japan. (See Fig. 542.)

FIG. 541. *The harbor of Canton, showing the types of native river craft.*

Industry and Enterprise. The chief reasons for the backwardness of China are the extreme conservatism of the people, which prevents them from adopting new inventions, and their religion, which teaches them to reverence the old and therefore prevents the introduction of new and progressive methods and ideas.

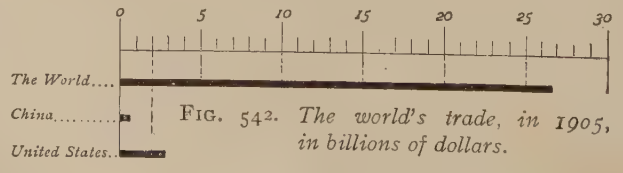


FIG. 542. *The world's trade, in 1905, in billions of dollars.*

Although the Chinese are particularly backward at the present time, yet it must be remembered that they once led in invention, and that the use of the compass and printing were known in China long before they were in any other part of the world.

TIBET

Characteristics and Products. Tibet is a lofty and barren country (see Figs. 503 and 543) with an extremely severe climate. The scattered population is most dense in the valley of the Brahmaputra. Sheep and goats form the principal wealth, although the yak is an important beast of burden. Cashmere wool is the most valuable product.

The only town is *Lhasa*, the holy city for the Buddhists, in which, until recently, no foreigners were allowed. In fact, the people of Tibet are so unfriendly to foreigners that large parts of the region are unexplored and little known.

CHINESE TURKISTAN

Surface and Trade. Chinese Turkistan is mostly an arid, desert-like tableland with a sparse, nomadic population. The only cultivated regions are in the oases at the foot of the mountains. *Kashgar* and *Yarkand* are the leading towns. They carry on a considerable caravan trade with China.

MONGOLIA

Climate and People. Mongolia is mostly made up of the great desert, Gobi, one of the largest and driest arid regions in the world. The people are nomads, following their herds of horses, camels, and sheep. They have no industries, and few products to contribute to the world's trade.

MANCHURIA

Industries. Manchuria is a mountainous region with valuable, but little worked, deposits of coal and iron. Farming is carried on along the river valleys; grazing is the leading industry elsewhere.

Cities. *Tairen* (Dalny), under Japanese control, at the end of the Trans-Siberian Railway, and *Port Arthur*, a Japanese naval station on the Yellow Sea, are the chief cities. *Harbin*, at the junction of the Manchurian and Trans-Siberian railways, is a growing town, and *Mukden*, on the Manchurian Railroad, besides being the capital, is an important military stronghold.

Questions and Exercises

(1) On an outline map write the names of the countries composing the Chinese Empire. (2) Color China in pale yellow. (3) Locate five important *treaty ports* and the Japanese port of Port Arthur.

(4) Where is the most thickly peopled part of China? (5) Why is the Hwang-ho called "China's Sorrow"? (6) What river in North America may be compared with the Yangtse-kiang because of the number of large towns on its banks?

(7) Locate Hankow. Give a reason why a town should grow up here. (8) What is exported from Hong-kong? (9) What are the disadvantages of the location of Peking? (10) To what race do the Chinese belong? (11) To what part of the United States have they emigrated in great numbers? (12) What do they do there?

(13) What geographical reason can you give for the fact that Tibet is so little explored? (14) Why is Manchuria desired by Russia? (15) Find out something about the building and the history of Tairen. (16) Explain the advantages of the position of Port Arthur as a Japanese port.

FIG. 543. *In the mountainous country, Tibet. Notice the farmhouse in the foreground built of stones gathered from the barren surface.*

LXXVI. CHOSEN (KOREA)

Surface and Climate. Chosen, with an area about as large as Great Britain, occupies the mountainous peninsula lying between the Yellow Sea and the Japan Sea. The country is now a part of the Japanese Empire. The winters in Chosen are severe and the summers are wet. The climate in spring and autumn is delightful.

Products; Trade. Forests abound in the hills of Chosen, and barley, oats and millet are raised in the valley regions of the north, where the summer climate is similar to that of northwestern Europe. Maize, rice, and tobacco are the principal products in the more temperate south, where the valleys produce two crops a year.

The exports include ginseng, a root which is sent to China, hides, beans, and rice. The chief imports are cotton goods from the United Kingdom and the United States. *Söul* is the capital, and *Chemulpo* is the principal port.

Questions and Exercises

(1) Draw a diagram showing the position of Chosen in relation to Japan and Russia. (2) Draw the boundary between Japan and Chosen; Russia and Chosen.

(3) Why was each of these countries so anxious for this peninsula? (4) Compare the climate of Chosen with that of Iceland. (5) Compare the products. (6) Why is not Chosen a progressive region like the United Kingdom? (7) Compare the latitudes of the United Kingdom and Chosen and explain the differences in climate.

FIG. 544. *The effect of an earthquake in Japan. Notice the warping of the railroad bridge.*

LXXVII. THE JAPANESE EMPIRE

The Japanese Empire includes all the islands from Kamchatka to the Philippines, except one-half of *Karafuto* (Sakhalin), and also the peninsula on which Port Arthur is located. The principal islands are *Niphon* (*Hondo*) or *Japan*, and *Yezo*.

Surface. Japan is made up of extremely mountainous and volcanic islands. It has more than fifty active and extinct volcanos, the most symmetrical and beautiful of which is *Fuji-yama*. Owing to the volcanic activity, the country is shaken by severe earthquakes each year, and all buildings have to be constructed so as to withstand these shocks. (See Fig. 544.)

The surface of Japan is extremely rugged. Partly for this reason there are few railroads and practically no highways to the interior, so that wheeled vehicles, except those drawn by men, are rare.

Climate and Vegetation. The climate of the Japanese Empire is both oceanic and continental in its character. Snow lies in the north until May, and copious rains fall in the south during the summer monsoon. The west coast receives some rain during the winter season when it is reached by the westerly winds blowing out from the continent.

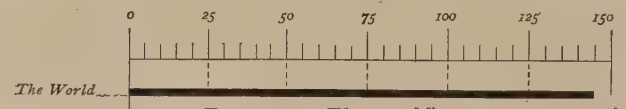


FIG. 545. *The world's average annual production of rice, 1901-05, in billions of pounds.*

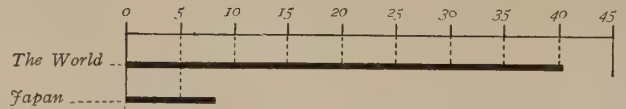


FIG. 546. *The world's production of raw silk, in 1902, in millions of pounds.*

Owing to the genial climate during the summer, the growth of vegetation is very rapid. One of the principal plants is the bamboo, which is used for furniture and paper; the tender shoots are used as food. Forests abound in the north.

Products of the Soil. Nearly one-eighth of the area of Japan is devoted to agriculture. The tools used are still, in many sections, very primitive. (See Fig. 547.) In spite of unfavorable condition, however, agriculture succeeds very well. Since agriculture is carried on wherever possible, little room is left for live stock. Japan produces little butter, milk, cheese, or wool.

The alluvial plains and terraced mountain slopes of the south, where the climate is warm and moist, are devoted chiefly to rice (see Figs. 545 and 574), sugar, and cotton. Cereals abound in the cooler north. Fruits of all kinds are raised abundantly, and grow to large size, but they lack the sweetness of similar fruits raised in the more severe climate of the eastern United States. Mulberry trees are cultivated as food for silkworms in most of the provinces. (See Figs. 546 and

FIG. 547. *Primitive plowing in the less civilized mountain districts of Japan.*

548.) Tea is grown in the southern provinces in great abundance.

Mineral Products. Japan has rich coal fields, especially in the island of Yezo. Sulphur is produced abundantly, as it is in most volcanic regions. Iron and kaolin for pottery are the other important earth products.

Manufacturing. Manufacturing in Japan is generally backward. It is mainly confined to handicrafts, to cotton and silk weaving, paper making, and the production of matches. The wood of the forests produces the material for matches, as it does in Sweden, and the Japanese are now making matches for export, particularly to the eastern coast of Asia.

FIG. 548. *Japanese girls picking silkworm cocoons from the straw beds.*

Trade and Enterprise. Interior communication in Japan is poor, but nearly every city is a port. *Yokohama*, the port of Tokyo, the capital, has an excellent harbor, and *Nagasaki* is an important shipbuilding center, from which much coal is exported. The trade of Japan is nearly as great as that of China, and is largely with the United Kingdom, the United States, China, and Germany. Silk, cotton goods, and coal are the most important exports. (See Figs. 511 and 549.) Tea is a valuable product in trade. Sugar is imported from China, and machinery and cottons from Europe and America. As is the case with China, the best known export to our country is tea; petroleum is sent in return. The Japanese, in contrast with their neighbors in China, have readily adopted European customs and industries, and are therefore progressing rapidly.

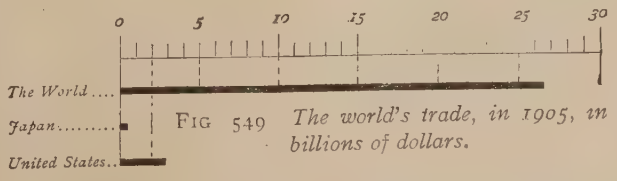


FIG 549 *The world's trade, in 1905, in billions of dollars.*

TAIWAN (FORMOSA)

Surface and Products. Taiwan, the most southern island of the Japanese Empire, is extremely mountainous. It is important chiefly for its tea and camphor. Indeed, it is the chief source of supply for camphor.

Questions and Exercises

(1) In what ways may Japan be compared with Great Britain? (Consider situation, coast line, and harbors.)

(2) What facts as to soil and climate render the plains so productive? (3) Find out by reading or from pictures how the buildings in Japan have to be constructed to withstand earthquake shocks.

(4) What Japanese manufactured articles have you seen? (5) Name any you may have in your home. (6) Through what American ports do products from Japan reach our country? (7) What does the United States export to Japan? (8) Why would you expect sulphur to be a product of Japan? Of southern Italy? (9) Try to imagine how different your food would be if the United States, like Japan, produced few dairy products.

LXXVIII. THE MALAY ARCHIPELAGO

Ownership and Characteristics. The Malay Archipelago, or Malaysia, is made up of all the islands southeast of Asia, except those belonging to China and to Japan. (See Fig. 554.) It includes *New Guinea* with the neighboring islands, and the *Philippines*, which now belong to the United States. Most of the islands of the Malay Archipelago

belong to European powers and form important colonies on account of their products. *Sumatra*, *Celebes*, *Java*, most of *Borneo* and *New Guinea*, and the *Moluccas* belong to the Netherlands. Taken together this group of islands is known as the *Dutch East Indies*.

Climate. The climate of the Malay Archipelago is everywhere moist and tropical, with little range in temperature and with only slight changes in the weather from day to day.

Plants and Animals. West of Wallace's Line, a line running between Borneo and Celebes which marks the division between two different animal and plant regions, are found palms, bamboos, laurels, oaks, and other trees common to Eurasia. Monkeys, tigers, rhinoceroses, tapirs, and elephants abound here, as they do throughout the Oriental Region.

East of Wallace's Line the trees are the tall eucalyptus and other forms characteristic of Australia. The animals are similar to those of the Australian Region. (See page 76.)

Products. The products of the Malay Archipelago are all tropical, and are of great value to the rest of the world.

In Java, which is one of the most important islands, coffee is the principal product, but this is now giving way, as it is in Ceylon, to tea and also to the growth of cinchona. *Batavia* is the principal city. (See Fig. 559.)

Tobacco is the chief product of Sumatra, coffee and cacao of the Celebes, and pepper of Borneo. The Molucca or Spice Islands furnish most of our cloves and nutmegs.

Tin is found in considerable quantities in the islands of *Banka* and *Billiton*, and is the only important mineral mined in the archipelago.

Questions and Exercises

(1) Make a list of the islands of the Malay Archipelago. (2) Opposite each write the name of the country to which it belongs. (3) Underline the two largest islands of this group.

(4) What is the yearly rainfall of these islands? (5) What coasts in America have an equal rainfall? (6) On an outline map draw Wallace's Line, and write the names of the plants and animals peculiar to each side of the line.

(7) Make a list of the chief products of the Malay Archipelago. (8) Which influenced the development of caravan and ocean trade in early times?

(9) Write a list of countries outside of Asia owning possessions in Asia. (10) Opposite each write the names of the possessions owned by that country.

Summary

Asia, the largest of the great land masses, contains the broadest plains, the loftiest and the most extensive highlands, and the greatest area of interior drainage of any continent in the world. Owing to its size and position, it has the widest range of climate known; and because of the severity of its climate in the central and northern portions, large areas are sparsely populated and little known.

In general it is an unprogressive continent. Agriculture and grazing are the chief occupations of the people. Manufacturing has been of little importance, but is developing rapidly in some countries, owing largely to the influence of Europeans, or to the enterprise of those nations which have adopted European methods.

Asia has a little more than one-tenth of the commerce of the world, at least one-third of which is centered in India. India and the Straits Settlements have more than one-half of the commerce of the continent, and these regions, together with China and Japan, have more than three-fourths of it. The commerce of eastern Asia is destined to grow apace as the countries come more in touch with the peoples of Europe and America, as they are bound to do as the years go on. In that commerce of the future the United States, owing to its position across the sea from Asia, and its near-by possessions in the Philippines, will have a leading place.

AUSTRALIA AND THE ISLANDS OF THE PACIFIC

LXXIX. AUSTRALIA

Size and Situation. The continent of Australia is about as large as the United States, not including Alaska and the other dependencies. It lies entirely in the subtropical and the temperate regions. It is the only considerable land mass in the water hemisphere and is, therefore, the most isolated of all the continents. (See Figs. 26, 28, and 550.)

Coast Line. The shore line of Australia is long and regular with few indentations; as a result the continent has few good harbors. Vessels proceeding along the wind-swept eastern coast are protected by the *Great Barrier Reef*, which extends along the northeastern shore for more than twelve hundred miles. This reef, which has been built by corals, is from twelve to fifteen miles off shore, and in places is a hundred miles wide. (See Fig. 552.) Quiet water usually prevails inside the reef and affords great protection to vessels in their passage along the coast. The channel of deep water is so narrow and tortuous, however, that sailing vessels rarely use this inside passage. If they do use it, they are obliged to anchor at night.

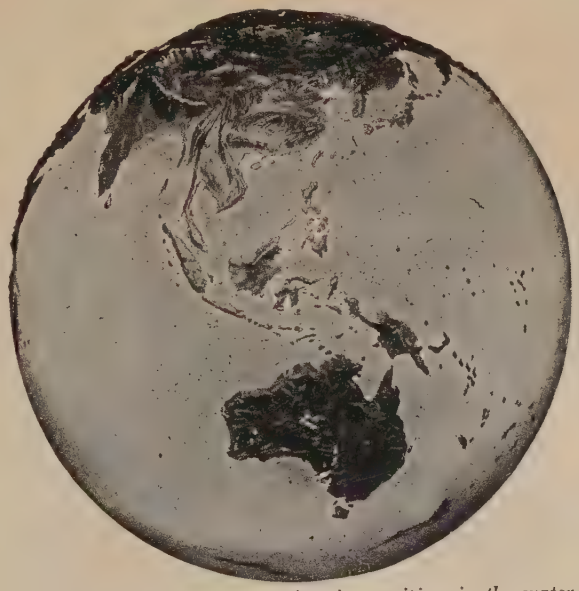


FIG. 550. *Australia, showing its position in the water hemisphere far from any other continent.*

Surface and Drainage. The great mountain system of Australia is the *Dividing Range* along the eastern and southeastern coast. This range is low in places, but attains high altitudes in the southeast, where peaks known as the *Australian Alps* rise over 7,000 feet. (See Figs. 551 and 553.) The Dividing Range separates the interior plain from the coastal valleys and contains the headwaters of the only considerable river of Australia, the *Murray*, with its tributary, the *Darling*. The Murray River is navigable at certain seasons for 1,700 miles, but a large sand bar at its mouth makes it difficult to enter and restricts its usefulness as a highway of commerce.

The western portion of Australia is a plateau about a thousand feet high, from which a few short rivers flow into the Indian Ocean during times of rain. The greater portion of the interior is an undulating plain containing many salt basins and short streams of interior drainage. Large parts of this region are but little known. The southern coast rises rather abruptly from the ocean to a height of about five hundred feet, and for a distance of seven hundred miles has no streams entering the sea. (See Fig. 551.)

Climate. During December and January Australia lies entirely in the southern trade-wind belt, but in June and July the southern part is in the region of the southern prevailing westerlies. The Dividing Range, lying on the windward side of the continent, has an

FIG. 551.

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Revised, 1909

important influence upon the rainfall. The trade winds lose most of their moisture in this range, and after crossing the mountains descend into the interior as drying, warming winds. (See Fig. 97.)

The rainfall along the eastern and the northern coasts is a little more than forty inches a year. It reaches a maximum of more than eighty inches, however, in the northern portion of the Cape York peninsula. Over large sections of the interior the rainfall is less than five inches a year and the region is therefore a desert.

During the southern summer, which reaches its height in January, the winds blow in toward the continent from nearly all directions, and the interior at that season is extremely hot. The average temperature of the interior in January is more than ninety degrees Fahrenheit. In winter the winds blow out from the continent as they do in Asia, and for that reason the interior at that

season is cold. The whole of Australia south of the Gulf of Carpentaria has an average winter temperature of between fifty and seventy degrees Fahrenheit.

In summer the Heat Equator lies over southern Australia, so that this region receives a heavy rainfall from the northwest trade winds. In winter when the Heat Equator has moved northward the southeasterly trade winds prevail, so that the northern part of the continent has a climate like India and other countries that are swept by monsoons. (See Fig. 84.)

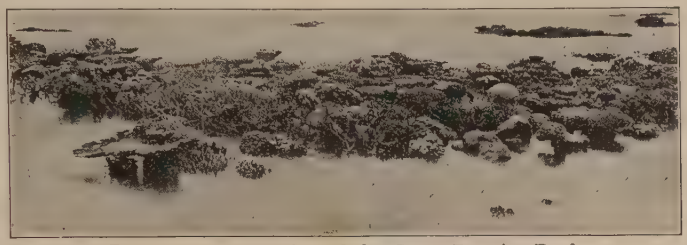

FIG. 552. *A section of the Great Barrier Reef.*

The southeastern and southern coasts have no frost at sea level, and thus the growing season in those districts is long. During the prevalence of the westerly winds, southwestern Australia and the island of Tasmania receive some rain.

Vegetation. The distribution of the vegetation in Australia is determined largely by the surface features and the climate. The northern coastal area is occupied by tropical forests and savannas. In the trade-wind regions of the southeastern coast lowly shrubs abound, and in the interior, steppes and deserts occupy almost all the area.

FIG. 553. *The towering peaks of the Australian Alps, with a portion of the broad interior plain.*

The eastern steppes are covered with grass and contain some oak [illegible] it is here that sheep are found in great numbers. The sheep find an admirable food in the long kangaroo grass which grows rankly during the growing season and dries on the stalk. In the dry regions there is much "salt bush," as the characteristic vegetation is called. The salt bush makes an excellent sheep food, and the wool from sheep raised in this region is especially fine.

The vegetation of Australia, as has already been stated (see page 316), is unlike that found anywhere else in the world. The continent is particularly rich in ferns and in tall forest trees, of which the eucalyptus, whose tall, straight, slender trunks often grow to a height of more than four hundred feet, is the best known.

Animals. The wild animals of Australia all belong to the Australian Region, and have already been described. (See page 76.) The common domestic animals of Europe have been extensively introduced and are of great importance. Rabbits, which were first brought into the commonwealth for pets and for food, have run wild and have so increased in numbers that they are now pests. Enormous sums of money have been spent in trying to rid the country of these animals, but without success.

People. The native people of Australia belong to the black race and are among the most primitive people in the world. They use only the simplest implements, and have no form of government. They are rapidly dying out, however, so that there are probably not more than sixty or eighty thousand of them left.

Revised, 1910

FIG. 554.

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The important people of Australia at the present time are the English, who have developed the continent to its present condition.

The Commonwealth of Australia. The five colonies of Australia, together with Tasmania, were combined under one government in 1901, forming the *Commonwealth of Australia*. The seat of government, now at Melbourne, eventually is to be in New South Wales, and distant not less than one hundred miles from Sydney.

Products of the Soil. The valuable products of the soil are nearly all derived from animals and plants introduced by the Europeans. The native animals are of little value; sheep are the most important domesticated animals. The sheep of Australia produce the finest merino wool, especially in the grassy region of the Murray River and its tributaries and in the salt bush. The sheep farms, known as "sheep runs," are leased from the government. (See Fig. 555.)

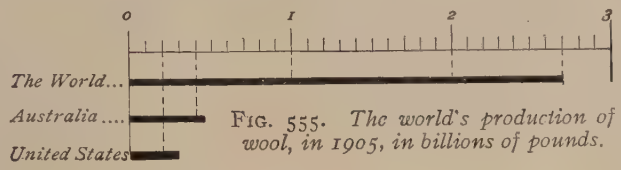

FIG. 555. *The world's production of wool, in 1905, in billions of pounds.*

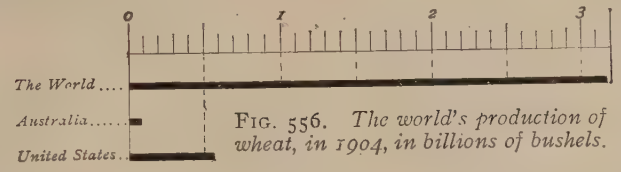

FIG. 556. *The world's production of wheat, in 1904, in billions of bushels.*

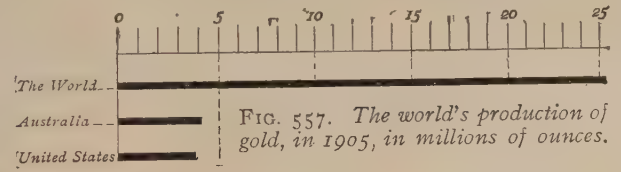

FIG. 557. *The world's production of gold, in 1905, in millions of ounces.*

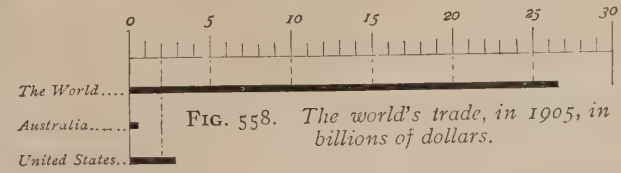

FIG. 558. *The world's trade, in 1905, in billions of dollars.*

The most important agricultural regions of Australia are *South Australia* and *Victoria*. Wheat is the chief crop in the temperate sunny south. (See Fig. 556.) Sugar cane is the leading crop of *Queensland* and northern *New South Wales*, which also produce bananas, oranges, and other tropical products.

Irrigation is practiced very extensively in northwestern Victoria; the water is drawn from the Murray River. On the irrigated regions valuable crops of oranges, figs, apricots, plums, and tobacco are raised. There are some agricultural areas scattered through *Western Australia*. The climate, however, is generally unfavorable to agriculture, and most of the fields are at a distance from the only available harbor of *King George's Sound*.

Mineral Products. Gold, discovered in 1851, is the chief mineral product of Australia. (See Figs. 557 and 586.) It is found in Queensland, New South Wales, Western Australia, and Victoria. Silver occurs and is mined chiefly in New South Wales and Queensland. Copper, tin, coal, and iron abound. Coal is mined in New South Wales. Pearls are found off the western coast, and pearl fishing is carried on in Western Australia.

Trade. Australia is deficient in means for interior communication. There are few highways, and most of the railroads are confined to the areas of somewhat dense population along the southeastern and eastern coasts. The leading towns are connected by a number of narrow-gauge roads with the gold, silver, and copper mines of the mountains. All the states are connected with Europe by steamers, and a cable across the Pacific to British Columbia was completed in 1902.

Wool and gold (see Figs. 555 and 557) are the chief exports. Most of the gold comes from Western Australia and Victoria; the wool from New South Wales, Queensland, and South Australia. The imports are chiefly textiles, manufactures, wheat, and sugar. More than one-half the trade is with the

AUSTRALIA AND ISLANDS OF THE PACIFIC
(Commercial)
SCALE
0 500 1000 1600
1000 Statute Miles to one inch
Principal Products
Navigable Portions of Rivers
Most important Railroads
Most important Steamship Lines
Longitude East from Greenwich
Revised, 1910
Copyright, 1904, by Rand, McNally & Company
Longitude West from Greenwich
ASIA
PACIFIC OCEAN
INDIAN OCEAN
AUSTRALIA
NEW ZEALAND
HAWAIIAN ISLANDS
PHILIPPINE ISLANDS
NETHERLANDS EAST INDIES
NEW GUINEA
CAROLINE ISLANDS
MARSHALL IS.
GILBERT IS.
PHOENIX IS.
LINE IS.
FANNING I.
WASHINGTON I.
CHRISTMAS I.
MIDWAY I.
WAKE I.
MARCUS I.
BONIN IS.
MARIANNE IS.
GUAM
SOCIETY IS.
COOK IS.
TUBUAI IS.
KERMADEC IS.
NORFOLK I.
NEW CALEDONIA
LOYALTY IS.
NEW HEBRIDES
SANTA CRUZ IS.
ELLICE IS.
FIJI IS.
SAMOA IS.
TONGA OR FRIENDLY IS.
PALAU IS.
NORTH ISLAND
SOUTH ISLAND
CHATHAM I.
Auckland
Christchurch
Dunedin
Wellington
Invercargill
Bluff
Hobart
Launceston
TASMANIA
Melbourne
Wilson's Promontory
Sydney
Newcastle
Brisbane
C. Byron
Rockhampton
Townsville
Cairns
Thursday I.
Torres Strait
Gulf of Carpentaria
Arafura Sea
Timor Sea
Banda Sea
Celebes Sea
Java Sea
Flores Sea
Molucca Sea
Sulu Sea
Gulf of Siam
South China Sea
Tropic of Cancer
Tropic of Capricorn
Equator
Latitude North
Latitude South
Darwin
Port Darwin
Palmerston
Pine Creek
Katherine
Daly Waters
Tennant Creek
Alice Springs
Oodnadatta
Charlotte Waters
Eucla
Esperance
Albany
Fremantle
PERTH
Coolgardie
Menzies
Kalgoorlie
Southern Cross
Geraldton
Roebourne
Cossack
Port Hedland
Broome
Derby
Wyndham
Halls Creek
Hall's Creek
Ord River
Victoria River Downs
Port Darwin
Pine Creek
Katherine
Daly Waters
Tennant Creek
Alice Springs
Oodnadatta
Charlotte Waters
Eucla
Esperance
Albany
Fremantle
PERTH
Coolgardie
Menzies
Kalgoorlie
Southern Cross
Geraldton
Roebourne
Cossack
Port Hedland
Broome
Derby
Wyndham
Halls Creek
Ord River
Victoria River Downs
Great Victoria Desert
Great Sandy Desert
Gibson Desert
Great Australian Bight
Nullarbor Plain
Murray River
Darling River
Murrumbidgee River
Lachlan River
Macquarie River
Hunter River
Clarence River
Richmond River
Tweed River
Brisbane River
Fitzroy River
Burdekin River
Flinders River
Gulf of Carpentaria
Arafura Sea
Timor Sea
Banda Sea
Celebes Sea
Java Sea
Flores Sea
Molucca Sea
Sulu Sea
Gulf of Siam
South China Sea
Tropic of Cancer
Tropic of Capricorn
Equator
Latitude North
Latitude South
Darwin
Port Darwin
Palmerston
Pine Creek
Katherine
Daly Waters
Tennant Creek
Alice Springs
Oodnadatta
Charlotte Waters
Eucla
Esperance
Albany
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PERTH
Coolgardie
Menzies
Kalgoorlie
Southern Cross
Geraldton
Roebourne
Cossack
Port Hedland
Broome
Derby
Wyndham
Halls Creek
Ord River
Victoria River Downs
Great Victoria Desert
Great Sandy Desert
Gibson Desert
Great Australian Bight
Nullarbor Plain
Murray River
Darling River
Murrumbidgee River
Lachlan River
Macquarie River
Hunter River
Clarence River
Richmond River
Tweed River
Brisbane River
Fitzroy River
Burdekin River
Flinders River
Gulf of Carpentaria
Arafura Sea
Timor Sea
Banda Sea
Celebes Sea
Java Sea
Flores Sea
Molucca Sea
Sulu Sea
Gulf of Siam
South China Sea
Tropic of Cancer
Tropic of Capricorn
Equator
Latitude North
Latitude South

FIG. 559.

mother country, and one-fifteenth with the United States. (See Fig. 558.) The most valuable export to the United States is wool; the imports from our country are largely lumber and machinery.

FIG. 560. *Melbourne. Across the water is the industrial portion of the city.*

Cities. With the exception of a few mining centers in the interior, all the large towns and cities of Australia are on or very near the seacoast. This is due to distribution of the rainfall which makes the eastern coast the leading agricultural region of the continent.

By far the largest part of the imports and exports of Australia go through *Melbourne*. Melbourne is a very picturesque city, situated in the midst of beautiful scenery. It has an excellent harbor, well equipped with docks, shipyards, and the other necessities for carrying on commerce. (See Fig. 560.)

The second commercial city of Australia is *Sydney*. It has a fine harbor (see Fig. 561), and is the terminus of most of the oceanic mail routes. Melbourne and Sydney are well situated for trade, because they are within easy reach of the principal agricultural regions of Australia.

Adelaide, the third commercial city in importance, has a poor harbor, and has been losing ground since the completion of the railroad connecting it with Melbourne. Vessels from Europe stop at Adelaide and leave their mails, which are sent by rail to the other chief cities of the commonwealth.

FIG. 561. *The harbor of Sydney, New South Wales.*

Questions and Exercises

(1) Compare the latitude of Sydney, Melbourne, Rio Janeiro, and Durban. (2) About how far from San Francisco is Sydney? (3) Trace the route you would take from San Francisco to Sydney. (4) Name the waters passed through and the probable cities stopped at. (5) How does a telegram from Melbourne reach London?

(6) What part of Australia receives rain from the northwest trade winds? From the southeast trade winds? (7) In what season does Perth have rains? In what months? (8) How does the Dividing Range affect the climate of eastern Australia? (9) Tell how the Dividing Range plays a part similar to the Sierra Nevada; the southern Andes. (10) Why should the interior of Australia be dry in summer

when winds are blowing toward the land? (11) At what season is the Murray River navigable for the greatest distance?

(12) Draw two sketch maps; one to show the position of the Heat Equator and the direction of the winds in January, and one to show the same for July. (13) Color both maps showing the heavy, moderate, and light rainfall. (14) On these maps write the chief vegetation areas.

(15) Compare the basin of the Murray-Darling River with that of the Mississippi. (16) If the Dividing Range were 1,000 feet lower what would be the effect on the climate and the rains of eastern Australia? (17) What would be the result if the Dividing Range ran between the Gulf of Carpentaria and the Great Australian Bight?

(18) Make a list of the states of the Commonwealth of Australia and write opposite each the name of the chief town. (19) Tell how the climate and the surface have affected the distribution of population.

FIG. 562. *Cattle grazing in the rich, level lands of eastern Tasmania.*

LXXX. TASMANIA AND NEW ZEALAND

TASMANIA

Climate and Products. The western portion of Tasmania is a highland, rising between two and three thousand feet. Eastern Tasmania is level and open, and is an excellent grazing region. (See Fig. 562.) The climate of the island is similar to that of England, but much colder; it is well adapted to the raising of hops and fruit. The westerly winds bring plenty of rainfall, which is uniformly distributed through the year. Copper, silver, and tin are the chief mineral products.

FIG. 563. *Mount Rolleston, in the Southern Alps. Notice the vapor rising from the mountain slopes.*

Hobart, picturesquely situated on a fine harbor, is the only town of importance. Its position on the south side of the island is in a way unfortunate, as it is so far distant from Australia.

NEW ZEALAND

Situation and Coast Line. The colony of New Zealand, consisting of two large islands and many smaller ones, is situated more than a thousand miles southeast of Australia. In the southwest there are many beautiful fiords, which form fine harbors. These harbors are of little value, however, because they have no good connection with the productive country east of the mountains. The important seaports are on the east coast.

Surface. The surface of New Zealand is in many parts very mountainous. The mountains near the western coast of South Island, known as the *Southern Alps*, rise to an altitude of 12,350 feet, and are covered by glaciers and forests. (See Figs. 563 and 564.)

Throughout a large part of the southern island the mountains rise like a wall and are without gaps or passes. In the northern island there are many volcanic peaks, some of which are still active. Hot springs and geysers are numerous; New Zealand has one of the three geyser regions of the world.

The only extensive lowland of New Zealand is the broad plain extending along the central eastern coast of South Island. It is

composed largely of arable land, and on the west merges into the mountain slopes, which, from their position on the leeward side of the mountains, are bare. Forests which produce timber of value are found on the western slopes of these mountains. Good agricultural land is also found on the small plains which are scattered along the coast of the northern island.

Climate. New Zealand lies in the region of the "roaring forties," and is therefore swept by strong winds. The rainfall, which is more than forty inches a year, is heaviest on the western side. The climate on the whole is warmer than that of England.

Products. The agricultural products of New Zealand are similar to those of England; wheat and oats are the most important. Large portions of the islands are occupied by rich pastures which support great numbers of sheep, cattle, and horses. The deposits of gold and coal are extremely rich.

FIG. 564. *In the Alpine district of South Island, famous for the beauty of its mountain and lake scenery.*

Trade; Cities. Nearly three-fourths of the trade of New Zealand is with the United Kingdom, and the rest is practically all with Australia, and the United States. The chief exports are various products of the grazing industry. New Zealand sends to the United Kingdom enormous quantities of the best frozen mutton received there. Horses, cattle, and butter are sent to New South Wales.

Auckland, the largest town, is important as a coaling station for vessels plying between Sydney and San Francisco. The next city in rank is *Wellington*, the center of the local government.

Questions and Exercises

(1) Compare the latitude of Tasmania and England. (2) Why is England warmer? (3) In what way is the climate like that of England? (4) In what way is Tasmania like Ceylon? (5) Name the strait separating island and mainland in each case. (6) How far is it from Hobart to Sydney? Hobart to Auckland?

(7) Compare the average summer and winter temperature of New Zealand. Account for the slight range. (8) Why should there be glaciers on the mountains? (9) What can you say of the scenery of New Zealand? (10) On a map of the world show the importance of Auckland. What towns are connected by the cable between New Zealand and Australia?

LXXXI. THE ISLANDS OF THE PACIFIC OCEAN

The Pacific Ocean is dotted with a great number of single islands and groups of islands, most of which are on the western side. Some of these, especially the Philippines, which are dependencies of our own country, we have already considered.

Ownership; Climate; Products. The larger number of the islands of the Pacific belongs to Germany, France, the United Kingdom, or the Netherlands, or are under the protection of these governments. Most of them lie in the tropics, and have a tropical climate. Many are of volcanic or of coral formation. The chief products are tropical in nature, and include bread fruit, cocoanuts, sugar cane, nutmegs, and pepper.

MELANESIA

The Solomon Islands, the New Hebrides, New Caledonia, and the Bismarck Archipelago are often grouped together. They are

called *Melanesia*, meaning the *Islands of the Blacks*, as they are inhabited mostly by Papuans, or natives of New Guinea.

POLYNESIA

Characteristics and People. The small islands lying east of the longitude of New Zealand are known as *Polynesia*. They are inhabited mostly by black or brown people (see Figs. 565 and 566), and are almost all within the tropics. Many are surrounded by coral reefs, so that the off-shore lagoons form good harbors. Bread fruit is produced throughout the region and forms the chief food of the people.

FIG. 565. *Carriers in the Fiji Islands.*

Surface and Climate. The most important islands are the *Fiji* and *Samoa* groups.

The Fiji Islands lie in the southeast trade-wind belt and their mountain slopes, rising more than 4,000 feet above the sea, have an abundant rainfall. The scenery is grand. These islands form a calling port for vessels crossing the Pacific, and are of some importance in commerce. They belong to the United Kingdom.

The Samoa Islands are similar to the Fiji Islands in climate and in surface features. The islands are liable to be swept by great storms, so that their harbors are not always safe. They belong to Germany, except *Tutuila* and the other islands east of the parallel 171 degrees, which belong to the United States. Tutuila is small and of little importance except for the harbor and coaling station of *Pago-Pago*.

FIG. 566. *A mother and children, in the Fiji Islands.*

Products; Trade. The chief products of the Fiji Islands are tropical fruits and sugar cane, though grazing products are increasing, owing to the introduction of cattle. Turtle and pearl shells and fish are secured along the coast. The trade is principally with the United Kingdom and Australia, from which machinery, cotton goods, and hardware are imported.

Copra, or the meat of the cocoanut, is the chief export of the Samoa Islands.

Questions and Exercises

(1) Cut a map of the world in two so that by joining the pieces you can have a whole map of the Pacific Ocean. (2) Locate the chief islands of Melanesia and Polynesia. (3) By using different colors indicate the nations to which these islands belong. (4) On the maps write the chief exports for which each group is important, and draw trade routes from these islands to the different nations to which they belong. (5) Make a list of all the islands of the Pacific that are *continental* rather than oceanic.

SUMMARY

Australia is the smallest and the most symmetrical continent. The climatic features are regularly distributed because the continent lies for a large part of the year in the region of the trade winds. The distribution of rainfall is strongly influenced by the distribution of the surface features; it is greatest on the windward slopes of the highlands and least in the low plains of the interior. The climate and surface are both favorable to grazing, so that this industry is the best developed. Australia has about two per cent of the commerce of the world, of which one-half is with the United Kingdom, and a little over one-fifteenth with the United States. The commonwealth is increasing rapidly in importance and is one of the most valuable and progressive colonies of the United Kingdom.

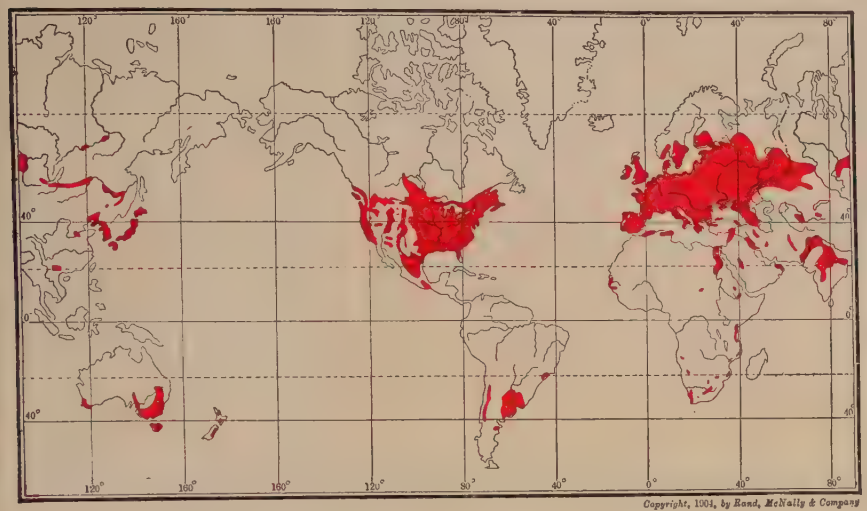

FIG. 567. *The wheat-producing areas of the world.*

LXXXII. A BRIEF SUMMARY OF THE WORLD'S COMMERCE AND INDUSTRY

The Agriculture of the World. Inasmuch as every one is dependent on the products of the soil for his food, agriculture and grazing are important occupations in all parts of the world. In the agricultural regions of the tropics crops can be raised easily because the deep, rich soil and moist climate favor the rapid growth of vegetation. In the temperate lands the climate is more changing, and hence even where the soils are rich the lands have to be tilled during the growing season in order to secure the best returns from the soil. Therefore agriculture as an occupation is best developed in the temperate regions and especially in the North Temperate Belt, where the population is much more dense than it is in the South Temperate Belt, and where the demand for food is consequently greater. (See Figs. 74, 119, and 169.)

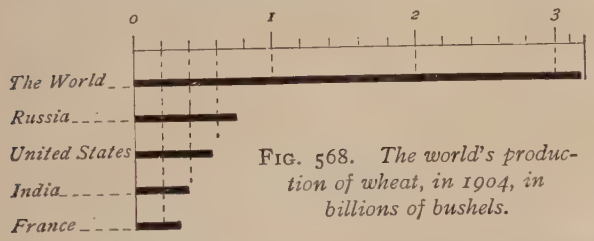

FIG. 568. *The world's production of wheat, in 1904, in billions of bushels.*

The Leading Crops of the Temperate Regions. The chief crops of the temperate regions are cereals, especially wheat, rye, oats, barley, and corn. Wheat and rye are the principal cereals used for food by the white race, while corn and oats are grown principally for stock, though both are used as food for people in certain countries. Wheat is

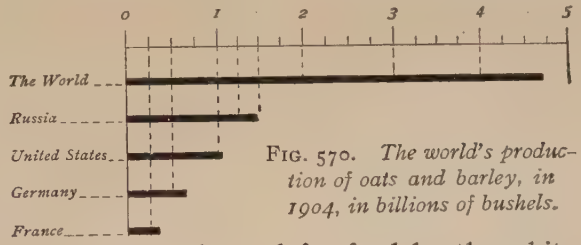

FIG. 570. *The world's production of oats and barley, in 1904, in billions of bushels.*

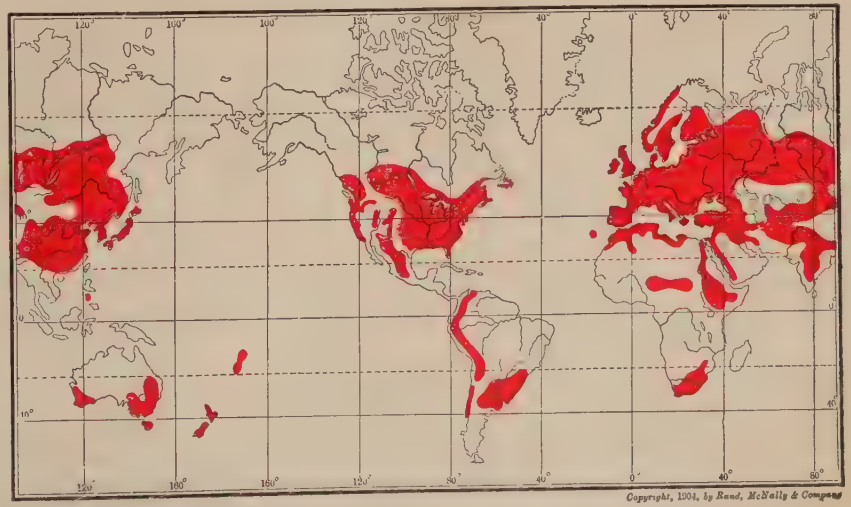

FIG. 569. *The oats and barley producing areas of the world.*

FIG. 571. *The corn-producing areas of the world.*

Rye. Rye is the chief food of the peasants of Germany, Russia, and other European countries. It thrives on poor soil which will raise no other grain and will stand a colder climate than wheat. The principal rye-producing countries are Russia and Germany, which together raise about seventy per cent of the world's crop. The production of rye in the United States is relatively unimportant.

rapidly supplanting rye as a food among the peasants of Europe, and is beginning to be used instead of rice in India, China, and Japan.

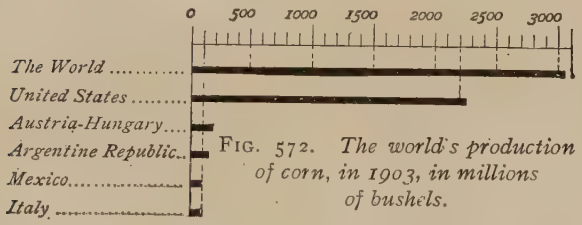

FIG. 572. *The world's production of corn, in 1903, in millions of bushels.*

Wheat. Wheat is the most important cereal that enters into the world's trade. Russia and the United States raise more than one-third of the total crop, owing to the vast areas of excellent soil adapted to wheat growing and to the favorable climate. The other wheat-producing nations in the order of their importance are India, France, Austria-Hungary, Italy, Germany, and the Argentine Republic. (See Figs. 567 and 568.) The United States sends to Europe a large part of the wheat and flour which it exports.

Oats. Oats can be grown in the temperate regions where wheat thrives. They are produced as a leading crop farther north than wheat. Russia leads the world with more than one-fourth of the oat crop. The United States is a close second. Germany and France also have a large share in the world's

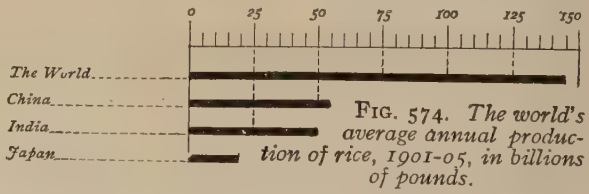

FIG. 574. *The world's average annual production of rice, 1901-05, in billions of pounds.*

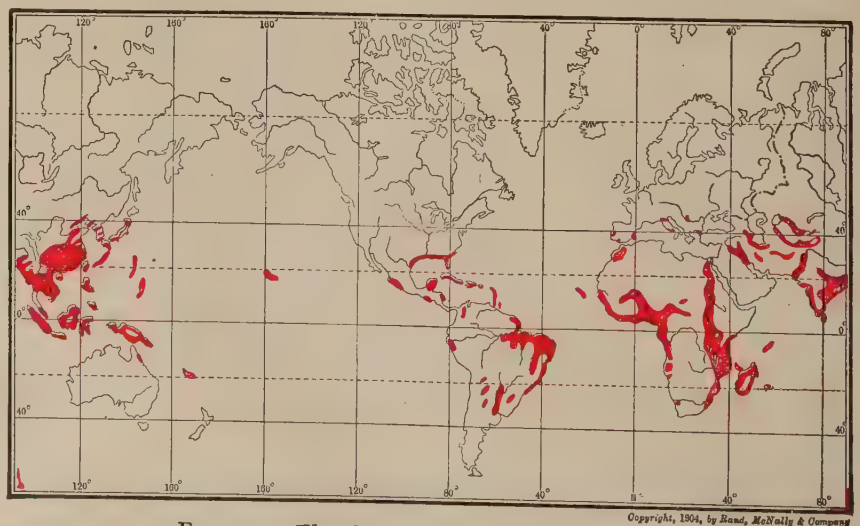

FIG. 573. *The rice-producing areas of the world.*

FIG. 575. *The sugar industry of the world.*

production of oats. More than twenty per cent of the oats shipped to Europe each year

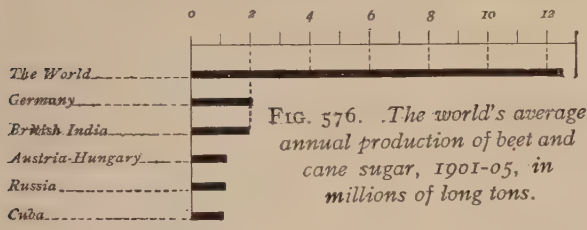

FIG. 576. *The world's average annual production of beet and cane sugar, 1901-05, in millions of long tons.*

is from the United States.

Barley. Barley thrives in a wider range of climate than any other cereal, though it is most successful in a climate similar to that favorable for oats. Practically eighty per cent of the barley of the world is grown in Europe, especially in Russia, Germany, Austria-Hungary, and Spain. (See Figs. 569 and 570.)

Corn. Indian corn is now very widely grown, though it originally was known only in the Americas. The United States produces about three-fourths of all the corn in the world, Austria-Hungary and Argentine Republic ranking second and third in importance. It is raised in every state in the Union, but is the chief crop of the Northern States of the Mississippi Basin, where the climate is especially favorable. The total value of the corn crop in the United States is greater than that of all the other cereals grown in this country. (See Figs. 571 and 572.)

The Leading Crops of the Tropical and Subtropical Countries. The chief crops of the warm and hot regions of the world are rice, cane sugar, tea, coffee, cocoa, cotton, and

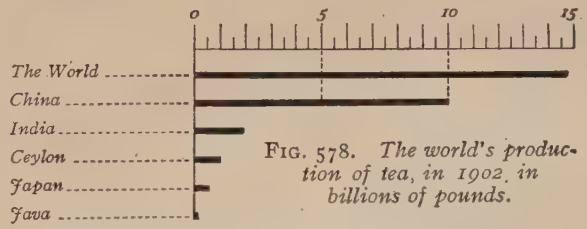

FIG. 578. *The world's production of tea, in 1902, in billions of pounds.*

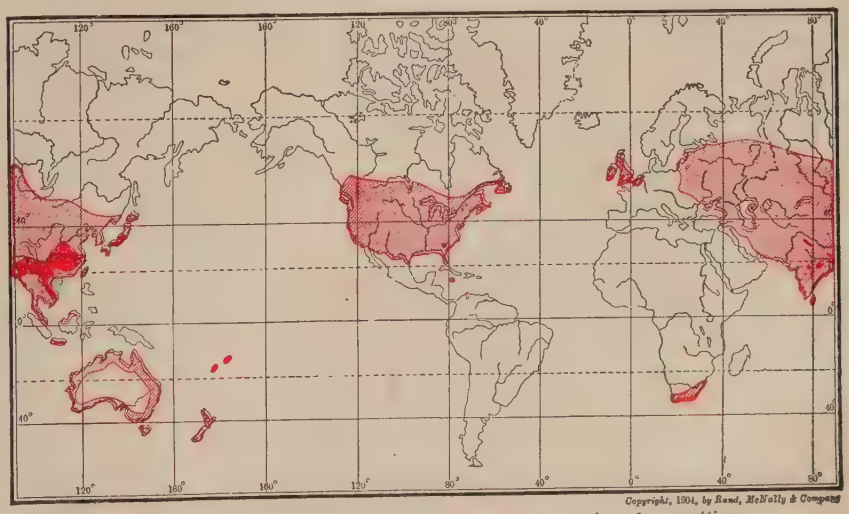

FIG. 577. *The world's production and consumption of tea.*

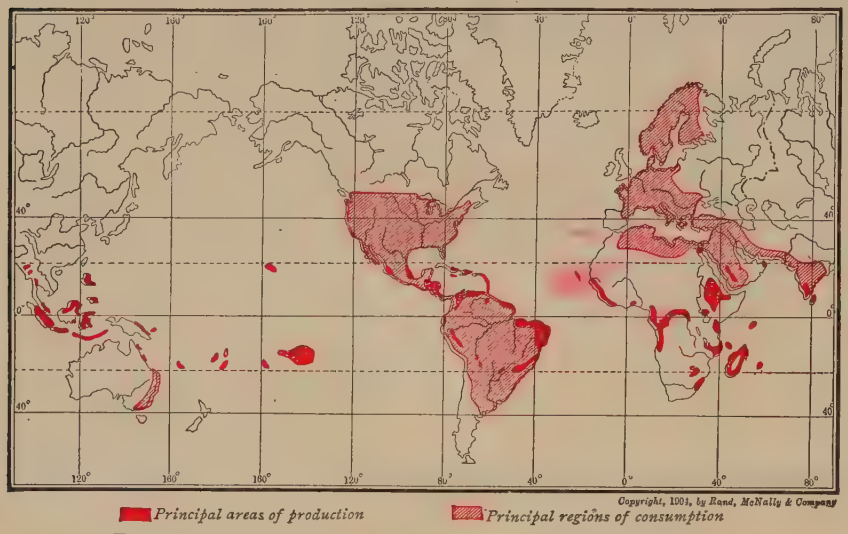

FIG. 579 *The world's production and consumption of coffee.*

tobacco. Certain of these crops, as, for instance, tobacco and tea, are grown also in the temperate regions, though they were formerly products of the warmer countries.

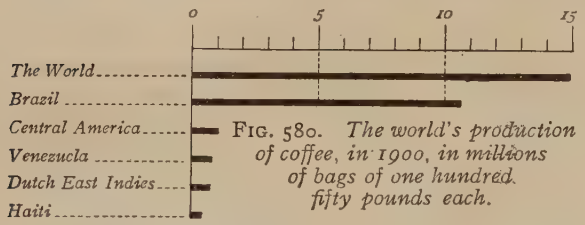

FIG. 580. *The world's production of coffee, in 1900, in millions of bags of one hundred fifty pounds each.*

Rice. Rice is the chief cereal of the world. It forms the principal food of millions of people of the yellow and brown races. It is, however, not as important commercially as the cereals of the temperate regions because it is used largely in the countries producing it. It is raised in great quantities in China, India, Japan, Indo-China, the Philippines, and Hawaii. The United States produces only about half of the rice needed for home consumption, and imports the rest, mostly from Hawaii. (See Figs. 573 and 574.)

Sugar. The sugar of commerce is either cane sugar or beet sugar, the latter being the most important and slightly outranking cane sugar in amount. Beet sugar is made in abundance in Germany, Russia, Austria-Hungary, and France. The United States imports much of its cane sugar, principally from the West Indies and from Hawaii. It is the largest import of the United States. (See Figs. 575 and 576.)

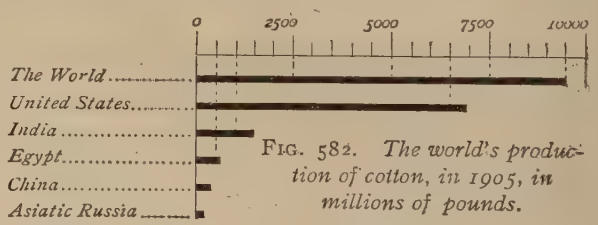

FIG. 582. *The world's production of cotton, in 1905, in millions of pounds.*

Tea. Tea is raised principally in China, India, Ceylon, and Japan, where the soil and climate are especially favorable. The greatest

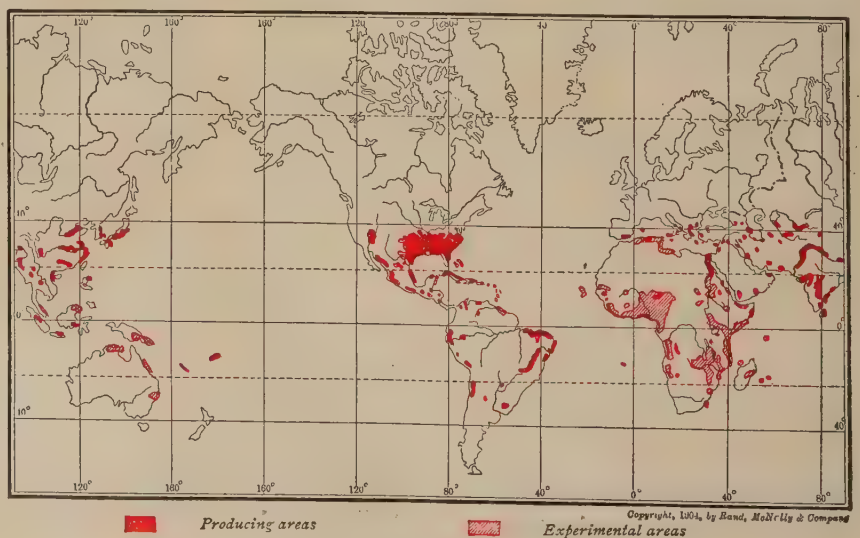

FIG. 581. *The cotton-producing areas of the world.*

FIG. 583. *The tobacco-producing areas of the world.*

consumers of tea are the United Kingdom, Russia, and America. (See Figs. 577 and 578.)

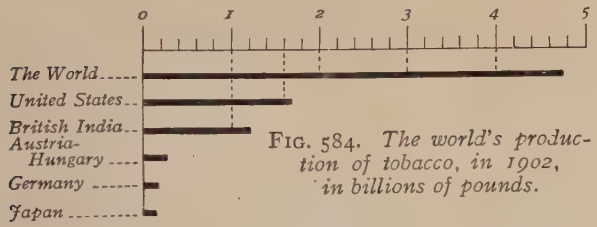

FIG. 584. *The world's production of tobacco, in 1902, in billions of pounds.*

Coffee. Coffee is distinctly a tropical product, and about ninety per cent of the coffee of the world is produced in Brazil, Central America, Venezuela, and Mexico. The United States receives most of its coffee from the American countries, and especially from Brazil. (See Figs. 579 and 580.)

Cotton. Cotton, the most important of the vegetable fibers, is raised in warm, moist, subtropical climates, and especially in the United States, India, Egypt, and China. The United States produces more than seventy per cent of the world's crop, and exports it largely to the cotton mills of the United Kingdom, Germany, and France. (See Figs. 581 and 582.)

Tobacco. Tobacco is grown widely in the temperate and tropical regions. The United States leads the world (see Figs. 583 and 584) in production and also in exports of tobacco. The product goes chiefly to Europe, Canada, Australia, Japan, and South Africa.

Gold and Silver. With the exception of Australia, the United States is the greatest gold-producing country of the world. In silver production, Mexico alone outranks the United States. (See Figs. 585, 586, and 588.)

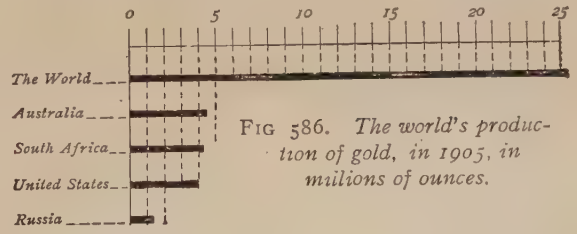

FIG. 586. *The world's production of gold, in 1905, in millions of ounces.*

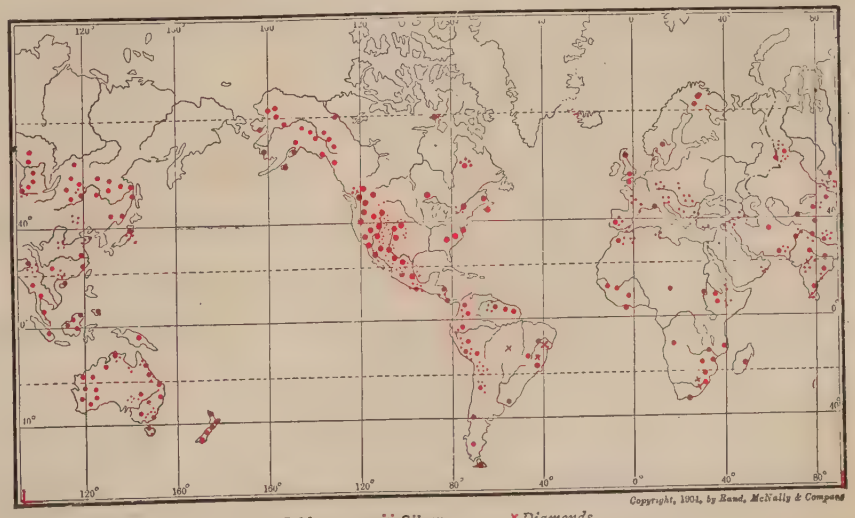

FIG. 585. *The distribution of gold, silver, and diamonds.*

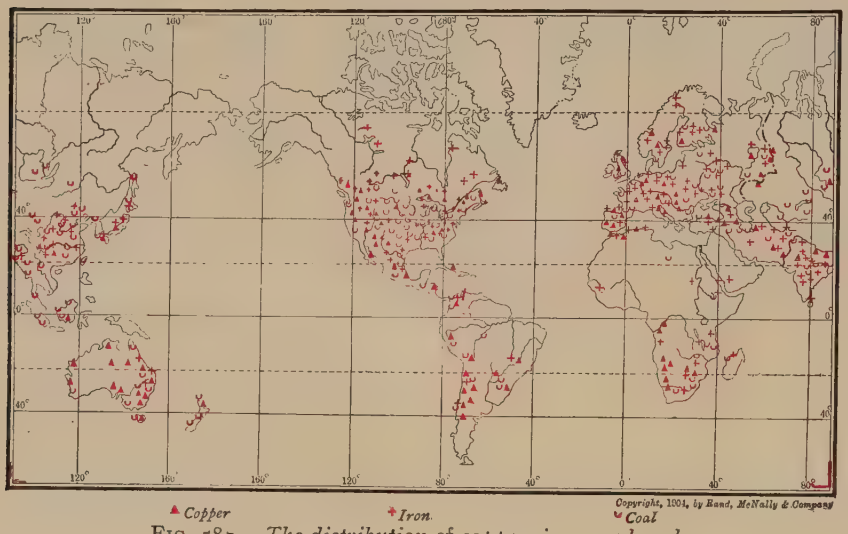

FIG. 587. *The distribution of copper, iron, and coal.*

Coal and Iron. The raw products already mentioned furnish the chief needs of the manufacturing nations, except for wool, coal, and iron. Many nations with supplies of coal and iron import their food materials largely and devote their attention to manufacturing. The nations with the greatest development of coal and iron mines are the United States, the United Kingdom, and Germany. (See Figs. 587, 590, and 591.)

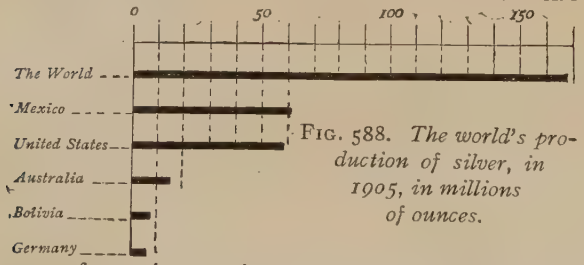

FIG. 588. *The world's production of silver, in 1905, in millions of ounces.*

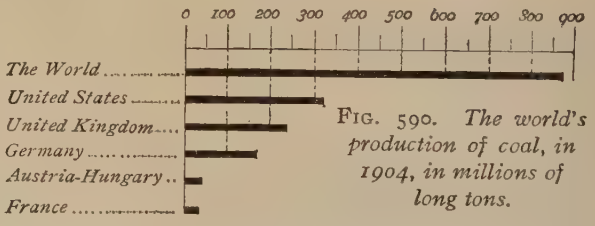

FIG. 590. *The world's production of coal, in 1904, in millions of long tons.*

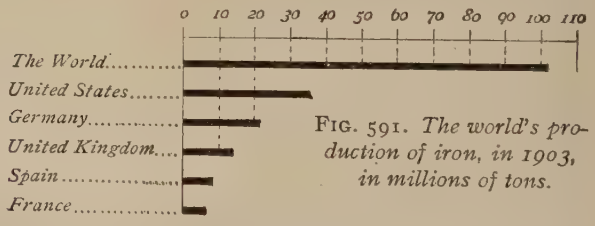

FIG. 591. *The world's production of iron, in 1903, in millions of tons.*

Manufactures. Owing to the supply of raw materials, coal, and iron, and to the inventiveness of the people, the United States, the United Kingdom, Germany, and France are the leading manufacturing nations, sending their finished products to all parts of the world. The exports of the United Kingdom and Germany outrank those of the United States, because our country, with its larger population and rapid progress, consumes a greater proportion of its manufactured products, and imports many manufactured products from other countries. (See Fig. 589.)

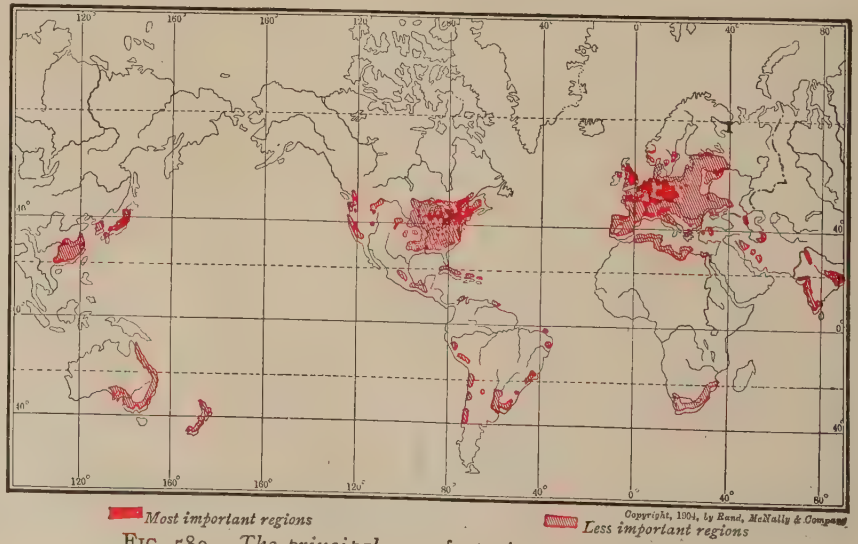

FIG. 589. *The principal manufacturing areas of the world.*

THE GREAT NATIONS OF THE WORLD

The leading nations of the world in the order of their commercial importance are the United Kingdom, Germany, the United States, France, and the Netherlands. The trade of the United States has already been considered. (See page 182.)

The United Kingdom. The imports of the United Kingdom are largely from the United States and the British possessions in all parts of the world. They include cereals, provisions, cotton, wool, and lumber. The exports are sent chiefly to the British Colonies and to the other nations of Europe. They are mainly cotton and woolen manufactures and iron and steel goods.

The advantages of the United Kingdom are many. Its geographical position, its climate favorable for continued labor, and its abundant supply of coal, iron, and other raw materials have all led to the development of manufacturing. Its magnificent system of railroads and interior waterways has enabled it to transport its many products to the neighboring seaports at small expense and with little delay. Its extensive colonies, situated in all the climates available for occupation, afford a magnificent market for its products, and have furnished food, raw materials, and tropical products much needed at home.

Germany. The imports of Germany exceed its exports. The principal trade is with the United Kingdom, Russia, Austria-Hungary, the United States, and the Netherlands. Germany receives from the United States food products and cotton.

Germany has many natural advantages. Its great mineral resources have been extensively developed, so that iron is available for manufacturing. The people have employed modern manufacturing processes and have adopted the most modern business methods. The great development of railroads and canals has brought every manufacturnig town into ready touch with the ports.

France. The imports of France are chiefly wool, raw silk, coal, cotton, and grain, of which nearly one-sixth in total value comes from the United States. Its exports include silk, cotton, and woolen manufactures and wine, of which the United Kingdom, Belgium, and Germany receive the greater part.

The advantages of France are mainly due to its varied surface, which allows for a variety of industries, and to a climate which favors the growing of silk worms and the raising of grapes. Manufacturing has developed because of the abundance of raw materials and the inventiveness of the people. France has also been favored by its position on the Atlantic and the Mediterranean, and by its system of navigable rivers and canals, which give access to the manufacturing regions.

The Netherlands. As the Netherlands owns the most valuable islands of the East Indies, its colonies rank next to those of the United Kingdom in importance. From these tropical regions it receives products of great value, needed by other countries. These include coffee and Peruvian bark. The imports are chiefly from Germany, the East Indies, Russia, Belgium, and the United Kingdom. About one-half of the exports are sent to Germany; the exports to the United States are insignificant in quantity. Owing to the position of the Netherlands on the coast and to its fine harbors, it receives a vast quantity of goods on their way to the other countries of continental Europe.

Exercises

(1) Select three of the staple food products of the world and write a composition about each under the following headings: (*a*) Value of product as food; (*b*) Conditions of climate and surface favorable to its growth; (*c*) Countries producing it and cities exporting it; (*d*) Part played by the United States in producing and consuming it. (2) Make a list of the chief tobacco-producing countries. (3) Locate a manufacturing city in each of the leading manufacturing countries.

SUGGESTIONS FOR COLLATERAL READING

The few suggestions for collateral reading given below have been selected with care so as to present only that which is best. No attempt has been made to prepare a list which shall contain all that is available and trustworthy. Such a list would have little practical value for teachers unless a large library were available. The references are given by chapters for convenience in use.

KEY TO ABBREVIATIONS

American Book Company (A. B. C.); D. Appleton & Company (Ap.); A. & C. Black (Bl.); Cassell Publishing Company (C.); The Century Company (Cen.); Ginn & Company (G.); D. C. Heath & Company (H.); Longmans, Green & Company (L. G.); The Macmillan Company (Mac.); Charles Scribner's Sons (S.); Sibley & Company (Si.); Silver, Burdett & Company (S. B. C.).

II. Page 10.

Ball's *Star Land* (C.), The Sun, pp. 1-69.

Jackson's *Astronomical Geography* (H.), Spherical Form of the Earth, Departure from the Spherical Form, pp. 1–9; Dimensions and Distances, pp. 16-21.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), The Shape of the Earth, pp. 8-12.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Earth's Form, pp. 3-11.

III. Page 12.

Jackson's *Astronomical Geography* (H.), Latitude and Longitude, pp. 9-13; The Earth's Daily Motion, pp. 28-39; The Inclination of the Earth's Axis, pp. 50-65.

Ball's *Star Land* (C.), The Sun, pp. 44-52.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), Day and Night, pp. 13-16.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Earth's Motions, pp. 11-12.

IV. Page 16.

Jackson's *Astronomical Geography* (H.), Zones, pp. 13-15; The Sun's Rays and the Earth's Atmosphere, pp. 21-28; The Earth's Yearly Motion, pp. 39-49.

Ball's *Star Land* (C.), The Sun, pp. 52-69.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Earth's Motion, pp. 12-17.

V. Page 21.

Dodge's *A Reader in Physical Geography* (L. G.), The World as a Whole, pp. 1-9; The Larger Features of the Continents, pp. 10-27.

Shaler's *First Book in Geology* (H.), Changes in the Shape of Land and Sea, pp. 141-145.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), The Sea, pp. 86-90.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), A General View of the Earth, pp. 32-36; Continents and Islands, pp. 162-173.

Ingersoll's *The Book of the Ocean* (Cen.), The Ocean and Its Origin, pp. 1-7.

VI. and VII. Pages 24-34.

Dodge's *A Reader in Physical Geography* (L. G.), The Work of Running Water, pp. 81-99; The Work of Standing Water, pp. 113-116.

Buckley's *The Fairy-land of Science* (Ap.), The Two Great Sculptors, pp. 103-121.

Shaler's *First Book of Geology* (H.), Origin of Valleys and Lakes, pp. 113-129.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), The Circulation of Water on the Land, pp. 39-42; Brooks and Rivers, pp. 62-75.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), Running Water, pp. 244-258; Lakes, pp. 258-269; The Work of Running Water, pp. 272-293.

VIII. Page 34.

Dodge's *A Reader in Physical Geography* (L. G.), Plains and Plateaus, pp. 137-143; Mountains, pp. 144-153.

Shaler's *First Book in Geology* (H.), Hills, Mountains, Valleys, and Continents, pp. 107-112.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Relief of the Land, pp. 173-182.

IX. Page 37.

Dodge's *A Reader in Physical Geography* (L. G.), Water Supply, pp. 206-212.

Shaler's *First Book in Geology* (H.), Course of Water Underground, pp. 74-87.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), How Springs Are Formed, pp. 42-47; The Work of Water Underground, pp. 47-51.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), Springs and Underground Rivers, pp. 222-232.

X. Page 39.

Dodge's *A Reader in Physical Geography* (L. G.), Volcanoes, pp. 154-164.

Shaler's *First Book in Geology* (H.), Volcanoes, pp. 88-97; Earthquakes, pp. 130-140.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), The Inside of the Earth, pp. 102-109.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), Volcanoes, pp. 196-210; Movements of the Land, pp. 210-216.

XI. Page 42.

Dodge's *A Reader in Physical Geography* (L. G.), What is Weather and Climate, pp. 171-175; Temperature, pp. 176-184; Climate of the World, pp. 194-197.

Buckley's *The Fairy-land of Science* (Ap.), The Aërial Ocean in Which We Live, pp. 53-64.

Shaler's *First Book in Geology* (H.), The Air, pp. 56-61.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), The Air, pp. 38-47; The Temperature of the Air, pp. 54-64; How the Surface of the Earth Crumbles Away, pp. 51-62.

Gaye's *The Great World's Farm* (Mac.), Pioneer Laborers, pp. 15-28; Soil Makers, pp. 29-40; Soil Carriers, pp. 41-49; Soil Binders, pp. 50-59; Field Laborers, pp. 60-89.

XII. Page 46.

Dodge's *A Reader in Physical Geography* (L. G.), Winds and Rainfall, pp. 185-188.

Buckley's *The Fairy-land of Science* (Ap.), The Aërial Ocean, pp. 64-75.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), Wind, pp. 24-27.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Pressure of the Air, pp. 47-54; The Movements of the Air, pp. 83-94.

XIII. Page 51.

Dodge's *A Reader in Physical Geography* (L. G.), Winds and Rainfall, pp. 188-193.

Buckley's *The Fairy-land of Science* (Ap.), A Drop of Water on Its Travels, pp. 76-102.

Gaye's *The Great World's Farm* (Mac.), Water, pp. 90-104; Deserts, pp. 105-121.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), The Vapor in the Air, pp. 27-39.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Moisture of the Air, pp. 64-83; Winds, pp. 94-102.

XIV. Page 57.

Dodge's *A Reader in Physical Geography* (L. G.), The Work of Standing Water, pp. 108-111.

Shaler's *First Book in Geology* (H.), Currents of the Air and Sea, pp. 98-106; The Work of Water and Air, pp. 62-65.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), The Motions of the Sea, pp. 90-95.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Movements of the Sea, pp. 143-146.

XV. Page 59.

Dodge's *A Reader in Physical Geography* (L. G.), Waves, pp. 100-108; Tides, pp. 111-113.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Movements of the Sea, pp. 137-143 and 147-152.

Ingersoll's *The Book of the Ocean* (Cen.), Waves, Tides, and Currents, pp. 9-26.

XVI. Page 61.

Dodge's *A Reader in Physical Geography* (L. G.), The Work of Standing Water, pp. 100-108 and 111-113; Movements of the Land, pp. 165-170.

Buckley's *The Fairy-land of Science* (Ap.), The Two Great Sculptors, pp. 121-124.

XVII. Page 62.

Dodge's *A Reader in Physical Geography* (L. G.), The Work of Ice and Frost, pp. 121-136.

Shaler's *First Book in Geology* (H.), Pebbles, Sand, and Clay, pp. 8-12.

Buckley's *The Fairy-land of Science* (Ap.), The Two Great Sculptors, pp. 124-128.

Geikie's *Physical Geography, Science Primer No. IV.* (Ap.), Snow-fields and Glaciers, pp. 75-85.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), Frosts, Snow-fields, Glaciers, pp. 293-314.

XVIII. Page 65.

Herbertson's *Man and His Work* (Mac.), Life in the Tundra or Frozen Desert, pp. 7-14; Life in the Temperate Forests, pp. 15-21; Life in the Steppes, pp. 22-31; Life in the Hot Deserts, pp. 32-36; Life in Equatorial Forests, pp. 37-42.

Redway's *Elementary Physical Geography* (S.), The Geographic Distribution of Plants and Animals, pp. 315-324.

XIX. Page 72.

Geikie's *Elementary Lessons in Physical Geography* (Mac.), The Geographical Distribution of Plants and Animals, pp. 328-337; The Diffusion of Plants and Animals, pp. 337-356.

Redway's *Elementary Physical Geography* (S.), The Geographic Distribution of Plants and Animals, pp. 324-328.

XX. Page 78.

Herbertson's *Man and His Work* (Mac.), The Races of Men, pp. 129-132.

Redway's *Elementary Physical Geography* (S.), Man, pp. 335-345.

XXI. Page 80.

Herbertson's *Man and His Work* (Mac.), Trade and Transport, pp. 98-115.

Dodge's *A Reader in Physical Geography* (L. G.), Centers of Industry, pp. 33-36; Transportation and Power, pp. 222-224.

Trotter's *Lessons in the New Geography* (H.), Commerce, pp. 129-144.

Adam's *Elementary Commercial Geography* (Ap.), Nature and Conditions of Commerce, pp. 1-4; Natural Conditions Affecting Commerce, pp. 5-16; Human Control of Commerce, pp. 17-36.

Ingersoll's *The Book of the Ocean* (Cen.), Dangers of the Deep, pp. 201-230.

XXII. Page 87.

Gaye's *The Great World's Farm* (Mac.), Man's Work on the Farm, pp. 337–360.

Tarr's *Elementary Physical Geography* (Mac.), Man and Nature, pp. 407–412.

XXIII.–XXXVII. Pages 89–182.

Herbertson's *Descriptive Geography of North America* (Bl.), Introduction, pp. xiii.–xxxvi.; Introductory, pp. 1–2.

Carpenter's *North America* (A. B. C.), General View of North America, pp. 9–14.

Shaler's *The Story of Our Continent* (G.).

Lummis' *Some Strange Corners of Our Country* (Cen.).

Lyde's *Man and His Markets* (Mac.).

XXIV. Page 102.

Herbertson's *Descriptive Geography of North America* (Bl.), The United States, pp. 82–84.

Adam's *Elementary Commercial Geography* (Ap.), The United States, pp. 37–145.

XXV.—XXVI. Pages 107–118.

Herbertson's *Descriptive Geography of North America* (Bl.), The Appalachian Barrier, p. 85.

XXVII.—XXVIII. Pages 119–128.

Herbertson's *Descriptive Geography of North America* (Bl.), Mountains of New England, pp. 88–90; The Connecticut Valley, pp. 90–93.

Carpenter's *North America* (A. B. C.), New England, pp. 76–99.

XXIX. Page 129.

Herbertson's *Descriptive Geography of North America* (Bl.), The Eastern Gateway of the United States, pp. 94–99; The Shenandoah Valley, pp. 99–100.

Carpenter's *North America* (A. B. C.), The Oil Regions, pp. 203–210; The Coal Regions, pp. 211–218; Pittsburg, pp. 218–225.

XXX. Page 136.

Herbertson's *Descriptive Geography of North America* (Bl.), New York, pp. 119–122; Philadelphia, pp. 122–123; Washington, pp. 123–125; Pittsburg, pp. 125–126.

Carpenter's *North America* (A. B. C.), Washington, pp. 14–45; Baltimore, pp. 45–49; Philadelphia, pp. 50–57; New York, pp. 57–75; Virginia, pp. 99–108; Niagara Falls, pp. 195–202.

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Areas of the Oceans

(Estimated by Ravenstein)

	AREA IN SQUARE MILES
Arctic	5,285,000
Antarctic	5,731,350
Indian	28,615,600
Atlantic	34,801,400
Pacific	67,699,630

Areas and Populations of the Continents

(From Supan's Die Bevölkerung der Erde, 1900)

	AREA IN SQUARE MILES	POPULATION
Australia	3,455,305	6,483,000
Europe	3,753,310	392,264,000
South America	6,849,531	38,482,000
North America	8,035,632	105,714,000
Africa	11,510,597	140,700,000
Asia	17,053,248	819,556,000

Area and Population of the Principal Countries of the World

(Based on the Statesman's Year Book for 1906)

	AREA IN SQUARE MILES	POPULATION
Abyssinia	150,000	3,500,000
Afghanistan	250,000	4,500,000
Argentine Republic	1,135,840	5,410,028
Austria-Hungary	241,333	45,405,267
Belgium	11,373	6,693,548
Belgian Congo	900,000	30,000,000
Bhutan	16,800	40,000
Bolivia	703,400	2,181,415
Brazil	3,218,130	14,333,915
British Empire	11,908,378	398,401,704
United Kingdom	121,392	41 609,091
Colonies in Europe, India and other Asiatic possessions	3,703	472,502
	1,914,597	300,569,864
Dominion of Canada	3,745,574	5,371,315
Newfoundland and other North American possessions	182,331	1,856,351
Union of South Africa and other African possessions	2,644,399	43,029,688
Commonwealth of Australia	2,972,918	3,836,154
New Zealand and other islands in Pacific Ocean	211,964	1,358,590
British Guiana and Falkland Islands (S. A.)	111,500	298,149
Chile	307,620	2,712,145
Chinese Empire	4,277,170	433,553,030
Colombia	473,202	3,916,666
Costa Rica	18,400	334,840
Cuba	44,000	1,572,845
Denmark	15,388	2,464,770
Dominican Republic	18,045	416,000
Ecuador	116,000	1,400,000
French Republic	4,262,130	95,638,085
France	207,054	38,961,945
Indo-China and other possessions in Asia	256,096	21,471,300
Algeria and other possessions in Africa	3,758,150	21,699,380
French Guiana and possessions in West Indies	31,660	425,050
Islands in Pacific Ocean	9,170	80,410
German Empire	1,236,650	68,745,178
Germany	208,830	56,367,178
German possessions in Africa	931,460	11,903,000
Kiao-Chou (Asia)	200	32,000
Islands in Pacific Ocean	96,160	443,000
Greece	25,014	2,433,806
Guatemala	48,290	1,842,134
Haiti	10,204	1,425,000
Honduras	46,250	744,901
Italy (Kingdom of)	199,050	33,926,117
Japanese Empire	175,866	50,926,595
Chosen (Korea)	82,000	12,000,000
Liberia	45,000	2,120,000
Luxemburg	998	236,543
Mexico	767,005	13,605,919
Monaco	8	15,180
Montenegro	3,630	228,000
Morocco	219,000	5,000,000
Nepal	54,000	5,000,000
Nicaragua	49,200	420,000
The Netherlands (Kingdom of)	795,511	41,636,465
The Netherlands	12,648	5,509,659
Dutch East Indies	736,400	36,000,000
Dutch West Indies	46,463	126,806
Norway	124,130	2,240,032
Ottoman Empire	2,779,940	63,816,540
Turkey (Europe, Asia, and Africa)	1,157 860	24,028,900
Tributary States	1,622,080	39,787,640
Panama	31 570	340,000
Paraguay	157,000	630,103
Persia	628,000	9,500,000
Peru	695,733	4,609,909
Portugal (Republic of)	838,442	14,567,448
Portugal	35,490	5,423,132
Portuguese possessions (Africa)	802,952	9,144,316
Roumania	50,720	6,400,000
Russian Empire	8,342,927[1]	144,184,600
Russia in Europe	2,122,527	123,163,900
Russia in Asia	6,220,400	21,020,700
Salvador	7,225	1,006,848
Servia	18,630	2,676,989
Siam	220,000	6,070,000
Spain (Kingdom of)	275,363	18,910,032
Spain and islands	194,783	18,618,086
Colonies	80,580	291,946
Sweden	172,876	5,260,811
Switzerland	15,976	3,425,383
United States (Republic of)	3,743,344	101,100,000
United States, including Hawaii and Alaska	3,624,122	92,276,154
Philippines and other possessions	119,222	8,823,846
Uruguay	72,210	978,048
Venezuela	364,000	2,590,981

[1] Exclusive of internal waters, Sea of Azov, Caspian Sea, etc.

Areas and Population of the United States and its Possessions

(From Federal Census, 1900, Vol. II, p. 605, Advance Reports 1910, and United States Geological Survey, Bulletin No. 302, Series F., Geography 53)

STATES	LAND SURFACE	WATER SURFACE	POPULATION
Alabama	51,279	719	2,138,093
Arkansas	52,525	810	1,574,449
California	156,092	2,205	2,377,549
Colorado	103,658	290	799,024
Connecticut	4,820	145	1,114,756
Delaware	1,965	405	202,322
District of Col.	60	10	331,069
Florida	54,861	3,805	752,619
Georgia	58,725	540	2,609,121
Idaho	83,779	534	325,594
Illinois	56,002	663	5,638,591
Indiana	35,885	469	2,700,876
Iowa	55,586	561	2,224,771
Kansas	81,774	384	1,690,949
Kentucky	40,181	417	2,289,905
Louisiana	45,409	3,097	1,656,388
Maine	29,895	3,145	742,371
Maryland	9,941	2,386	1,205,346
Massachusetts	8,039	227	3,366,416
Michigan	57,480	500	2,810,173
Minnesota	80,858	3,824	2,075,708
Mississippi	46,362	503	1,797,114
Missouri	68,727	693	3,293,335
Montana	145,776	796	376,053
Nebraska	76,808	712	1,192,214
Nevada	109,821	869	81,875
New Hampshire	9,031	310	430,572
New Jersey	7,514	710	2,537,167
New York	47,654	1,550	9,113,614
North Carolina	48,740	3,686	2,206,287
North Dakota	70,183	654	577,056
Ohio	40,740	300	4,767,121
Oklahoma	69,414	643	1,657,155
Oregon	95,607	1,092	672,765
Pennsylvania	44,832	294	7,665,111
Rhode Island	1,067	181	542,610
South Carolina	30,495	494	1,515,400
South Dakota	76,868	747	583,888
Tennessee	41,687	335	2,184,789
Texas	262,398	3,498	3,896,542
Utah	82,184	2,806	373,351
Vermont	9,124	440	355,956
Virginia	40,262	2,365	2,061,612
Washington	66,836	2,291	1,141,990
West Virginia	24,022	148	1,221,119
Wisconsin	55,256	810	2,333,860
Wyoming	97.594	320	145,965
TERRITORIES			
Alaska	590,884	....	64,356
Arizona	113,840	116	204,354
Hawaii	6,449	....	191,909
New Mexico	122,503	131	327,301
OTHER POSSESSIONS			
Guam	210	....	9,000
Panama Canal Zone	474	....	.....
Philippines, The	115,026	717,942	7,635,426
Porto Rico	3,435	.....	1,118,012
Tutuila, Samoa Islands	77	....	5,800

Twenty-five Largest Cities in the United States

(Thirteenth Census of the United States, Advance Reports Census 1910)

	POPULATION
1. New York, N. Y	4,766,883
2. Chicago, Ill	2,185,283
3. Philadelphia, Pa	1,549,008
4. St. Louis, Mo	687,029
5. Boston, Mass	670,585
6. Cleveland, Ohio	560,663
7. Baltimore, Md	558,485
8. Pittsburg, Pa	533,905
9. Detroit, Mich	465,766
10. Buffalo, N. Y	423,715
11. San Francisco, Cal	416,912
12. Milwaukee, Wis	373,857
13. Cincinnati, Ohio	364,463
14. Newark, N. J	347,469
15. New Orleans, La	339,075
16. Washington, D. C	331,069
17. Los Angeles, Cal	319,198
18. Minneapolis, Minn	301,408
19. Jersey City, N. J	267,779
20. Kansas City, Mo	248,381
21. Seattle, Wash	237,194
22. Indianapolis, Ind	233,650
23. Providence, R. I	224,326
24. Louisville, Ky	223,928
25. Rochester, N. Y	218,149

Other Important Cities in Each of the Political Divisions of the United States

(Thirteenth Census of the United States, Advance Reports)

	POPULATION
Aberdeen, S. Dak	10,753
Akron, Ohio	69,067
Albany, N. Y	100,253
Albuquerque, N. Mex	11,020
Asheville, N. C	18,762
Atchison, Kans	16,429
Atlanta, Ga	154,839
Augusta, Ga	41,040
Aurora, Ill	29,807
Bangor, Me	24,803
Barre, Vt	10,734
Baton Rouge, La	14,897
Bay City, Mich	45,166
Biddeford, Me	17,079
Birmingham, Ala	132,685
Bisbee, Ariz	9,019
Boise, Idaho	17,358
Bridgeport, Conn	102,054
Burlington, Vt	20,468

Other Important Cities in Each of the Political Divisions of the United States—*Continued*

	POPULATION
Butte, Mont.	39,165
Cambridge, Mass.	104,839
Camden, N. J.	94,538
Cedar Rapids, Iowa	32,811
Charleston, S. C.	58,833
Charleston, W. Va.	22,996
Charlotte, N. C.	34,014
Chattanooga, Tenn.	44,604
Cheyenne, Wyo.	11,320
Colorado Springs, Colo.	29,078
Columbia, S. C.	26,319
Columbus, Ohio	181,548
Concord, N. H.	21,497
Covington, Ky.	53,270
Council Bluffs, Iowa	29,292
Cumberland, Md.	21,839
Dallas, Tex.	92,104
Davenport, Iowa	43,028
Dayton, Ohio	116,577
Decatur, Ill.	31,140
Denver, Colo.	213,381
Des Moines, Iowa	86,368
Dover, N. H.	13,247
Dubuque, Iowa	38,494
Duluth, Minn.	78,466
East St. Louis, Ill.	58,547
Elizabeth, N. J.	73,409
El Paso, Tex.	39,279
Erie, Pa.	66,525
Evansville, Ind.	69,647
Everett, Wash.	24,814
Fall River, Mass.	119,295
Fargo, N. Dak.	14,331
Fort Smith, Ark.	23,975
Fort Wayne, Ind.	63,933
Fort Worth, Tex.	73,312
Galveston, Tex.	36,981
Grand Forks, N. Dak.	12,478
Grand Rapids, Mich.	112,571
Great Falls, Mont.	13,948
Hagerstown, Md.	16,507
Harrisburg, Pa.	64,186
Hartford, Conn.	98,915
Helena, Mont.	12,515
Honolulu, Hawaii	52,183
Hot Springs, Ark.	14,434
Houston, Tex.	78,800
Huntington, W. Va.	34,161
Jackson, Miss.	21,262
Jacksonville, Fla.	57,699
Johnstown, Pa.	55,482
Joliet, Ill.	34,670
Joplin, Mo.	32,073
Kalamazoo, Mich.	39,437
Kansas City, Kans.	82,331
Knoxville, Tenn.	36,346
La Crosse, Wis.	30,417
Leavenworth, Kans.	19,363
Lewiston, Idaho	6,043
Lewiston, Me.	26,247
Lexington, Ky.	35,099
Lincoln, Nebr.	43,973
Little Rock, Ark.	45,941
Lowell, Mass.	106,294
Lynn, Mass.	89,336
Macon, Ga.	40,665
Manchester, N. H.	70,063
Manila, Philippine Islands	219,928
Memphis, Tenn.	131,105
Meridian, Miss.	23,285
Mobile, Ala.	51,521
Montgomery, Ala.	38,136
Muskogee, Okla.	25,278
Nashua, N. H.	26,005
Nashville, Tenn.	110,364
New Bedford, Mass.	96,652
New Britain, Conn.	43,916
New Haven, Conn.	133,605
Newport, Ky.	30,309
Nome, Alaska	2,600
Norfolk, Va.	67,452
Oakland, Cal.	150,174
Ogden, Utah	25,580
Oklahoma City, Okla.	64,205
Omaha, Nebr.	124,096
Oshkosh, Wis.	33,062
Parkersburg, W. Va.	17,842
Paterson, N. J.	125,600
Pawtucket, R. I.	51,622
Pensacola, Fla.	22,982
Peoria, Ill.	66,950
Phoenix, Ariz.	11,134
Pine Bluff, Ark.	15,102
Pocatello, Idaho	9,110
Portland, Me.	58,571
Portland, Ore.	207,214
Portsmouth, Va.	33,190
Pueblo, Colo.	44,395
Quincy, Ill.	36,587
Racine, Wis.	38,002
Raleigh, N. C.	19,218
Reading, Pa.	96,071
Reno, Nev.	10,867
Richmond, Va.	127,628
Roanoke, Va.	34,874
Rockford, Ill.	45,401
Roswell, N. Mex.	6,172
Rutland, Vt.	13,546
Sacramento, Cal.	44,696
Saginaw, Mich.	50,510
St. Joseph, Mo.	77,403
St. Paul, Minn.	214,744
Salem, Ore.	14,094
Salt Lake City, Utah	92,777
San Antonio, Tex.	96,614
San Juan, Porto Rico	48,716
Savannah, Ga.	65,064
Schenectady, N. Y.	72,826
Scranton, Pa.	129,867
Sheridan, Wyo.	8,408
Shreveport, La.	28,015
Sioux City, Iowa	47,828
Sioux Falls, S. Dak.	14,094
South Bend, Ind.	53,684
South Omaha, Nebr.	26,259
Spartanburg, S. C.	17,517
Spokane, Wash.	104,402
Springfield, Ill.	51,678
Springfield, Mo.	35,201
Superior, Wis.	40,384
Syracuse, N. Y.	137,249
Tacoma, Wash.	83,743
Tampa, Fla.	37,782
Terre Haute, Ind.	58,157
Toledo, Ohio	168,497
Topeka, Kans.	43,684
Trenton, N. J.	96,815
Trinidad, Colo.	10,204
Troy, N. Y.	76,813
Tucson, Ariz.	13,193
Utica, N. Y.	74,419
Vicksburg, Miss.	20,814
Waterbury, Conn.	73,141
Wheeling, W. Va.	41,641
Wichita, Kans.	52,450
Wilkes-Barre, Pa.	67,105
Wilmington, Del.	87,411
Wilmington, N. C.	25,748
Winona, Minn.	18,583
Worcester, Mass.	145,986
Yonkers, N. Y.	79,803
Youngstown, Ohio	79,066

Twenty-five Largest Cities in the World

(*Largely based on Statesman's Year Book, 1910*)

		POPULATION
1.	London, England	7,429,740
2.	New York, U. S. A.	4,766,883
3.	Paris, France	2,763,393
4.	Tokyo, Japan	2,186,079
5.	Chicago, U. S. A.	2,185,283
6.	Berlin, Germany	2,101,933
7.	Vienna, Austria	2,085,888
8.	St. Petersburg, Russia	1,678,000
9.	Philadelphia, U. S. A.	1,549,008
10.	Moscow, Russia	1,359,254
11.	Ozaka, Japan	1,226,590
12.	Buenos Aires, Argentine Rep.	1,189,252
13.	Constantinople, Turkey	1,106,000
14.	Calcutta, India	1,026,987
15.	Singan-fu, China	1,000,000
16.	Canton, China	900,000
17.	Glasgow, Scotland	872,021
18.	Hankow, China	820,000
19.	Rio de Janeiro, Brazil	811,265
20.	Hamburg, Germany	802,793
21.	Bombay, India	776,006
22.	Warsaw, Russia	756,426
23.	Tientsin-fu, China	750,000
24.	Budapest, Austria-Hungary	732,322
25.	Peking, China	700,000

Other Large Cities in the Different Countries of the World

(*Largely based on Statesman's Year Book, 1910*)

		POPULATION
1.	Adelaide, Australia	178,300
2.	Aleppo, Turkey	200,000
3.	Alexandria, Egypt	332,246
4.	Algiers, Algeria	138,240
5.	Amsterdam, Holland	565,589
6.	Antananarivo, Madagascar	72,000
7.	Antwerp, Belgium	314,135
8.	Arequipa, Peru	37,000
9.	Asuncion, Paraguay	60,259
10.	Athens, Greece	167,479
11.	Auckland, New Zealand	82,101
12.	Bagdad, Turkey	145,000
13.	Bahia, Brazil	230,000
14.	Baku, Asiatic Russia	179,133
15.	Bangkok, Siam	500,000
16.	Barcelona, Spain	533,000
17.	Barranquilla, Colombia	40,200
18.	Basel, Switzerland	139,600
19.	Batavia, Java	138,551
20.	Beirut, Syria	120,000
21.	Belfast, Ireland	349,180
22.	Belgrade, Servia	77,816
23.	Bergen, Norway	72,251
24.	Birmingham, England	563,629
25.	Bogotá, Colombia	123,300
26.	Bordeaux, France	251,917
27.	Breslau, Germany	470,904
28.	Bridgetown, Barbados	32,500
29.	Bristol, England	377,642
30.	Brussels, Belgium	637,807
31.	Bukarest, Roumania	300,000
32.	Cairo, Egypt	654,476
33.	Callao, Peru	31,000
34.	Cape Town, U. of S. A.	91,973
35.	Caracas, Venezuela	72,429
36.	Cardiff, Wales	195,303
37.	Christiania, Norway	227,626
38.	Cologne, Germany	428,722
39.	Colombo, Ceylon	158,228
40.	Concepcion, La, Chile	55,330
41.	Copenhagen, Denmark	514,134
42.	Damascus, Syria	260,000
43.	Dresden, Germany	516,996
44.	Dublin, Ireland	398,356
45.	Dundee, Scotland	164,409
46.	Durban, U. of S. A.	60,244
47.	Edinburgh, Scotland	355,366
48.	Fez, Morocco	140,000
49.	Geneva, Switzerland	121,206
50.	Genoa, Italy	275,000
51.	George Town, British Guiana	53,176
52.	Ghent, Belgium	163,763
53.	Gothenburg, Sweden	162,480
54.	Guadalajara, Mexico	101,208
55.	Guayaquil, Ecuador	80,000
56.	Hyderábád, India	448,466
57.	Halifax, Nova Scotia	40,832
58.	Hanoi, Indo-China	150,000
59.	Havana, Cuba	297,159
60.	Helsingfors, Finland	117,317
61.	Hobart, Tasmania	24,655
62.	Hong-kong, China (British)	329,650
63.	Jerusalem, Syria	70,000
64.	Johannesburg, U. of S. A.	158,580
65.	Kimberley, U. of S. A.	34,331
66.	Kingston, Jamaica	46,542
67.	Kyoto, Japan	442,462
68.	La Paz, Bolivia	78,856
69.	Leeds, England	484,012
70.	Leipzig, Germany	503,672
71.	Lhasa, Tibet	17,000
72.	Liége, Belgium	175,870
73.	Lille, France	205,602
74.	Lima, Peru	140,884
75.	Lisbon, Portugal	356,009
76.	Liverpool, England	760,357
77.	Lodz, Russian Poland	351,570
78.	Lourenço Marques, Port. East Africa	9,849
79.	Lucknow, India	264,049
80.	Lyons, France	472,114
81.	Madras, India	509,346
82.	Madrid, Spain	539,835
83.	Malaga, Spain	130,109
84.	Manchester, England	655,435
85.	Maracaibo, Venezuela	34,284
86.	Marseilles, France	517,498
87.	Mecca, Arabia	60,000
88.	Melbourne, Australia	549,200
89.	Mexico, Mexico	344,721
90.	Milan, Italy	584,000

Other Large Cities in the Different Countries of the World—*Continued*

		POPULATION
91	Montevideo, Uruguay	316,000
92.	Montreal, Canada	267,730
93.	Mukden, Manchuria, China	158,132
94.	Munich, Germany	538,983
95.	Nagoya Japan	378,231
96.	Naples, Italy	596,000
97.	Odessa, Russia	449,673
98.	Oporto, Portugal	167,955
99.	Ottawa, Canada	59,928
100.	Palermo, Italy	319,000
101.	Prague, Austria	233,649
102.	Pretoria, U. of S. A.	21 161
103.	Quebec, Canada	68,840
104.	Quito, Ecuador	70,000
105.	Rome, Italy	575,000
106.	Rosario, Argentine Republic	150,000
107.	Rotterdam, Holland	411,635
108.	Santiago, Chile	332,724
109.	Santiago, Cuba	45,470
110.	São Paulo, Brazil	348,000
111.	Seville, Spain	148,315
112.	Sheffield, England	470,958
113.	Singapore, Straits Settlements	238,555
114.	Smyrna, Turkey	201,000
115.	Sofia, Bulgaria	100,000
116.	Söul, Chosen (Korea)	150,000
117.	Southampton, England	124,667
118.	Stettin, Germany	224,119
119.	Stockholm, Sweden	339,582
120.	Surabaya, Java	150,108
121.	Sydney, Australia	592,100
122.	Tabriz, Persia	200,000
123.	Tashkend, Asiatic Russia	155,673
124.	Teherañ, Persia	280,000
125.	The Hague, Holland	259,012
126.	Tiflis, Asiatic Russia	159,590
127.	Toronto, Canada	208,040
128.	Trieste, Austria	221,993
129.	Tripoli, Tripoli	30,000
130.	Tunis, Tunis	227 519
131.	Turin, Italy	371,000
132.	Valencia, Spain	213,530
133.	Valencia, Venezuela	38,654
134.	Valparaiso, Chile	162,447
135.	Vancouver, Canada	26,133
136.	Venice, Italy	160,000
137.	Wellington, New Zealand	63,807
138.	Winnipeg, Canada	42,340
139.	Yokohama, Japan	394,303
140.	Zanzibar, Zanzibar	55,750
141.	Zürich, Switzerland	183,500

Principal Rivers of the World

NORTH AMERICA

(Based on Longman's Gazetteer of the World)

	APPROXIMATE LENGTH IN MILES	APPROXIMATE AREA DRAINED, IN SQUARE MILES
Missouri-Mississippi	4,194	1,238,642
Yukon	2,050	440,000
Colorado	2,000	267,000
Rio Grande	1,800	145,200
Columbia	1,400	260,000
Saskatchewan-Nelson	1,392	360,000
Athabaska-Mackenzie	1,100	677,000
St. Lawrence	1,034	297,000

SOUTH AMERICA

Amazon	3,415	2,320,000
Paraná-La Plata	2,170	1,200,000
São Francisco	1,800	397,600
Orinoco	1,550	365,000

EUROPE

Volga	2,325	563,300
Danube	1,800	315,000
Dnieper	1,334	202,200
Don	1,153	166,130
Northern Dvina	1,100	134,000
Dniester	853	16,510
Rhine	810	86,600
Elbe	720	55,340
Vistula	652	73,000
Tagus	566	31,864
Oder	552	43,300
Loire	543	46,756
Rhone	504	38,000
Seine	425	30,028
Po	418	26,800

ASIA

	APPROXIMATE LENGTH IN MILES	APPROXIMATE AREA DRAINED, IN SQUARE MILES
Ob	3,235	1,150,870
Yangtse-kiang	3,000	700,000
Lena	2,860	908,980
Amur	2,700	787,000
Mekong	2,600	350,000
Yenisei	2,500	792,300
Hwang-ho	2,300	387,150
Indus	2,000	360,050
Brahmaputra	1,800	360,000
Ganges	1,455	397,300

AFRICA

Nile	3,670	1,620,000
Congo	2,800	1,000,000
Niger	2,600	780,000
Zambezi	1,600	550,000

AUSTRALIA

Darling	1,160	198,000
Murray	1,100	270,000

Principal Lakes of the World

NORTH AMERICA

	AREA IN SQ. MILES	ALTITUDE IN FEET
Superior	31,200	602
Huron	23,800	581
Michigan	22,450	581
Great Bear	14,000	391
Erie	9,960	573
Winnipeg	9,400	710
Ontario	7,240	246
Great Slave	7,100	520
Nicaragua	2,975	106
Great Salt[2]	2,560	4,218

SOUTH AMERICA

Titicaca	3,261	12,500

EUROPE

Ladoga	7,000	55

ASIA

Caspian Sea[2]	169,383	86[1]
Lake Aral[2]	26,166	158
Baikal	13,197	1,400
Dead Sea[2]	353	1,290[1]

[1] Below sea level. [2] Salt.

AFRICA

Victoria Nyanza	32,167	3,300
Nyassa	10,000	1,577
Tanganyika	14,000	2,670
Chad	10,400	850

Principal Mountains of the World

NORTH AMERICA

	WHERE LOCATED	HEIGHT IN FEET
Mt. McKinley	Alaska	20,464
Mt. Logan	Canada	19,539
Orizaba	Mexico	18,314
Mt. St. Elias	Alaska-Yukon frontier	18,024
Popocatepetl	Mexico	17,550
Wrangell	Alaska	17,500
Mt. Whitney	California	14,502
Massive Mountain	Colorado	14,424
Mt. Shasta	California	14,380
Mt. Rainier	Washington	14,363
Longs Peak	Colorado	14,271
Pikes Peak	Colorado	14,108
Fremont Peak	Wyoming	13,790
Mt. Hood	Oregon	11,225

SOUTH AMERICA

Aconcagua	Argentine Rep.	22,860
Chimborazo	Ecuador	20,498
Misti	Peru	20,320
Cotopaxi	Ecuador	19,480
Tolima, Nevado de	Colombia	18,300

EUROPE

	WHERE LOCATED	HEIGHT IN FEET
Mont Blanc	France	15,780
Monte Rosa	Swiss-Italian Frontier	15,215
Mulahacen	Spain	11,781
Pic de Nethou	Spain	11,170
Mt. Etna	Italy	10,865
Mt. Hecla	Iceland	5,096
Mt. Vesuvius	Italy	4,260

ASIA

Mt. Everest	Himálayas	29,002
Godwin-Austen	Himálayas	28,265
Kánchanjangá	Himálayas	28,156
Mustagh-ata	Pamirs	25,800
Elbruz	Russia	18,525
Demavend	Persia	18,200-21,520
Ararat	Armenia	16,925
Fuji-yama	Japan	12,440
Mt. Hermon	Palestine	9,050

AFRICA

Mt. Kenia	Brit. E. Africa	19,300-19,720
Kilima-njaro	Ger. E. Africa	19,270
Mt. Ruwenzori	Brit. E. Africa	16,600
Ras Dashan	Abyssinia	15,000-15,500
Tizi Tamjurt	Morocco	14,650-15,150
Mongo Ma Loba	Kamerun	13,000
Mont aux Sources	U. of S. A. (Western frontier of Natal)	10,000

OCEANIA

Mauna Kea	Hawaiian Islands	13,953
Mauna Loa	Hawaiian Islands	13,760
Kinabalu	Borneo	13,680
Mount Victoria	New Guinea	13,205
Mt. Cook	New Zealand	12,350

Total Length of Railroads of the World

(Based on Statesman's Year Book for 1906)

CONTINENTS	LENGTH IN MILES
North America	248,046
Europe	189,001
Asia	48,224
South America	29,664
Australia and Islands of the Pacific	17,164
Africa	13,993
	546,092

Length of Railroads in the Different Countries

COUNTRIES	LENGTH IN MILES
Argentine Republic	12,000
Austria-Hungary	23,729
Belgium	2,830
Belgian Congo	300
Bolivia	700
Brazil	10,408
British Empire	95,205
United Kingdom	22,034
India and other Asiatic possessions	28,111
Canada, Dominion of	19,611
Australia, Commonwealth of	14,577
British Africa	6,809
New Zealand	2,487
Newfoundland and British West Indies	872
British Guiana (South America)	104
Chile	2,875
Chinese Empire	2,870
Colombia	411
Costa Rica	340
Cuba	1,479
Denmark	1,993
Ecuador	125
French Republic	33,004
France	28,580
Algeria and other African possessions	3,424
Indo-China	900
New Caledonia (Pacific Ocean)	100

Length of Railroads in the Different Countries—

Continued

COUNTRIES	LENGTH IN MILES
German Empire	33,539
Germany	32,804
German Possessions in Africa	505
Kiao-chou, China	230
Greece	700
Guatemala	400
Haiti and Dominican Republic	145
Honduras	69
Italy	10,068
Japan	4,889
Chosen (Korea)	612
Luxemburg	326
Mexico	12,209
The Netherlands (Kingdom)	3 273
The Netherlands (Europe)	1,817
Dutch East Indies (Asia)	1,456
Nicaragua	160
Norway	1.548
Ottoman Empire	7 544
Turkey in Europe	2,890
Turkey in Asia	2,186
Egypt	2,468
Panama	47
Paraguay	156
Peru	1,146
Portugal and Portuguese East Africa (487)	1,973
Roumania	2,000
Russian Empire	42,559
Russia in Europe	36,187
Russia in Asia	6,372
Salvador	100
Servia	360
Siam	350
Spain	8,520
Sweden	7,631
Switzerland	2,898
United States (Republic of)	212,862
United States	212,349
Alaska	112
Porto Rico	153
Hawaii	128
Philippines	120
Uruguay	1,210
Venezuela	529

Some Ocean Trade Routes of the World

(*From Bartholomew's Twentieth Century Citizens' Atlas of the World*)

POINT OF DEPARTURE	DESTINATION	DISTANCE IN MILES	APPROXIMATE TIME, IN DAYS
Alexandria	London	2,275	6
Alexandria	Liverpool	3,027	14
Algiers	Liverpool	1,664	8
Apia (Samoa)	San Francisco	4,200	14
Bahia	Southampton	4,505	16
Bahia	Liverpool	4,430	19
Batavia	Marseilles	7,178	27
Batavia	Southampton	8,330	36
Bombay	London	6,658	25
Bombay	Liverpool	6,255	27
Bombay	Marseilles	4,924	16
Boston	Glasgow	2,785	10
Boston	Liverpool	2,932	9
Buenos Aires	Southampton	6,126	22
Buenos Aires	Liverpool	6,253	25
Calcutta	Liverpool	7,985	34
Callao	Liverpool	9,895	40
Cape Town	Southampton	6,010	19–24
Christiania	Hull	558	2
Colon	Southampton	5,252	19
Constantinople	Liverpool	3,015	10
Copenhagen	Leith, Hull (Leith)	616	58 hrs
Fiji Islands	Vancouver	5,235	18
Fiji Islands	Sydney	1,725	6
Genoa	Southampton	2,134	8
Genoa	Glasgow	2,254	10
Gibraltar	London	1,299	5
Gothenburg	London	644	3
Halifax	Liverpool	2,415	7
Havana	New Orleans	585	2
Hobart	London	11,951	41
Hong-kong	Southampton	10,075	39
Hong-kong	Marseilles	8,180	30
Jamaica	Southampton	4,702	16
Lisbon	Liverpool	973	4
Lisbon	Southampton	855	3
Madagascar	Marseilles	6,077	25
Manila	Liverpool	9,575	32
Melbourne	Southampton	11,931	45
Melbourne	Marseilles	9,720	35
Montevideo	Southampton	6,170	22
Montevideo	Liverpool	6,095	25
Montreal	Liverpool	2,850	9
New Orleans	London	4,690	14
New Orleans	Liverpool	4,615	14
New York	Liverpool	3,170	6
New York	Glasgow	3,280	8
New York	Southampton	3,110	6
Odessa	Liverpool	3,335	12
Pernambuco	Liverpool	3,674	15
Portland (Me.)	Liverpool	2,770	8
Port Said	Liverpool	4,050	14
Port Said	Marseilles	1,568	5
Quebec	Liverpool	2,855	8
Rio de Janeiro	Liverpool	5,156	19
Shanghai	Southampton	10,045	43
Shanghai	Marseilles	9,050	36
Shanghai	Vancouver	4,300	19
Singapore	Southampton	8,638	33
Stockholm	London	1,171 and 903	4
Suez	Liverpool	3,274	10
Suez	Marseilles	1,655	6
Sydney	Southampton	12,401	49
Sydney	Marseilles	10,296	34
Valparaiso	Liverpool	8,748	37
Vera Cruz	Liverpool	5,031	20
Vladivostok	Southampton	11,748	50
Wellington	London	13 345	46
Yokohama	London	11,601	52
Zanzibar	London	6,225	40
Zanzibar	Marseilles	4,745	20
Zanzibar	Hamburg	7,130	36

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A map showing the standard time belts in the United States and Canada

Standard Time

(*Based on Hazell's Annual, 1910*)

Generally speaking, Greenwich time, or Greenwich time plus or minus an integral number of hours, is in use in most of the leading countries of the world.

Greenwich time is used in	Great Britain, Spain, Belgium, Holland
One hour faster than Greenwich in	Italy, Austria, Switzerland, Germany, Denmark, Norway
Two hours faster than Greenwich in	Cape of Good Hope, The Transvaal, Orange Free State, Natal, Turkey, Egypt
Eight hours faster than Greenwich in	West Australia, Shanghai
Nine hours faster than Greenwich in	Japan
Nine and one-half hours faster than Greenwich in	South Australia
Ten hours faster than Greenwich in	Victoria, Queensland, New South Wales
Eleven hours faster than Greenwich in	New Zealand

In the United States and the Dominion of Canada, Greenwich time is used. These countries extend over so many degrees of longitude, however, that they are necessarily divided into five belts, in which the time is slower than Greenwich time by four, five, six, seven, and eight hours, respectively. The time in these belts is known as intercolonial, eastern, central, mountain, and Pacific time. The lines dividing the belts have been determined by the railroads. People traveling west in the United States set their watches back one hour when crossing from one belt to the next. Traveling east they set them forward.

The Leading Commercial Countries

(Based on the Statesman's Year Book, 1904, and Chisholm's Handbook of Commercial Geography.)

Country.	Principal Products.	Principal Exports.	Total Value of Exports.
Afghanistan	Fruits, felt, wool	Horses, fruits, grain	
Algeria	Wine, wool, potatoes	Wine, wool, potatoes	$ 62,496,000
Argentine Republic	Animal products, wheat	Animal products, wheat	178,128,000
Australia	Wool, gold, wheat	Gold, wool	348,120,000
Austria-Hungary	Cereals, coal, iron	Sugar, animals, animal products, coal	386,544,000
Belgium	Cereals, coal, iron	Coal, woolens, linens	787,915,000
Bolivia	Minerals, rubber	Silver, tin, rubber	11,777,000
Brazil	Coffee, rubber, tobacco	Coffee, rubber, tobacco	174,936,000
Bulgaria	Wheat, wine, tobacco	Grain, animal food, food products	20,737,000
Canada	Grain, timber, metals	Timber, cheese, wheat	225,850,000
Cape of Good Hope	Diamonds, gold, wool	Diamonds, gold, wool	83,789,000
Ceylon	Rice, tea, cocoa	Tea, cocoanut products, plumbago	27,975,000
Chile	Minerals, cereals, guano	Nitre, copper, iodine	66,917,000
China	Cereals, tea, silk	Silk, tea, cotton	148,354,000
Chosen	Gold, grain, ginseng	Gold, rice, ginseng	4,158,000
Colombia	Gums, coffee, precious metals	Gums, coffee, gold	3,417,000
Costa Rica	Coffee, bananas	Coffee, bananas	5,433,000
Cuba	Sugar, tobacco	Sugar, tobacco, cigars	64,949,000
Denmark	Dairy products, cereals	Provisions, animals, cereals	119,611,000
Dominican Republic	Sugar, cacao, tobacco	Sugar, cacao, tobacco	5,224,000
Dutch East Indies	Coffee, tea, sugar	Coffee, tea, sugar	102,097,000
Ecuador	Cacao, ivory nuts, coffee	Cacao, ivory nuts, coffee	8,872,000
Egypt	Cotton, cereals, sugar	Cotton, cereals, provisions	94,445,000
France	Cereals, wine, sugar	Textiles, yarn, wine	1,119,400,000
Germany	Cereals, coal, iron, potatoes	Textiles, hardware, chemicals	1,155,080,000
Greece	Cereals, fruits, tobacco	Currants, ores, olive oil	18,799,000
Guatemala	Coffee, sugar, bananas	Coffee, timber, hides	9,032,000
Haiti	Coffee, woods, cacao	Coffee, woods, cacao	12,760,000
Hawaii	Sugar, rice, coffee	Sugar, rice, coffee	26,228,000
India	Cereals, cotton, oil-seeds	Cotton, jute, rice, oil-seeds	270,514,000
Italy	Silk, fruit, grain	Silk, olive oil, sulphur	294,484,000
Jamaica	Sugar, coffee, fruit	Fruit, sugar, rum	11,003,000
Japan	Cereals, tea, silk	Silks, cotton yarn, coal	133,928,000
Madagascar	Gold, cattle, rice	Gold, cattle, raffia	2,629,000
Mexico	Metals, henequen, animals	Metals, henequen, animals	90,955,000
Morocco	Grain, eggs, almonds	Grain, eggs, almonds	7,487,000
Natal	Coal, sugar, cereals	Coal, wool, sugar	34,651,000
Netherlands	Cereals, textiles, dairy products	Cereals, hardware, textiles	691,200,000
Newfoundland	Fish, iron, coal	Fish, iron ore, fish oil	9,392,000
Norway	Timber, fish, animals	Timber, fish, paper	48,827,000
Orange Free State	Diamonds, coal, sheep	Diamonds, garnets, sheep	1,368,000
Panama	Fruit, coffee, rubber	Fruit, coffee, rubber	1,175,000
Paraguay	Paraguay tea, fruit, cattle	Paraguay tea, tobacco, hides	3,891,000
Persia	Fruit, cotton, opium	Fruit, cotton, opium	12,048,000
Peru	Metals, sugar, cotton	Metals sugar, cotton	18,727,000
Philippines	Hemp, copra, sugar, tobacco	Hemp, tobacco, sugar	28,672,000
Porto Rico	Coffee, sugar, tobacco	Sugar, tobacco, coffee	14,867,000
Portugal	Wine, cereals, fruit	Wine, cork, canned fish	30,710,000
Roumania	Grain, sheep, cattle	Grain, fruit, wood	74,964,000
Russia	Grain, petroleum, fibers	Grain, raw materials, animal products	469,040,000
Salvador	Coffee, indigo, tobacco	Coffee, indigo, sugar	10,278,000
Servia	Grain, plums, animals	Animal products, grain	13,848,000
Siam	Rice, teak, sea products	Rice, teak, sea products	21,763,000
Spain	Grain, fruits, minerals	Wine, minerals, fruit	150,423,000
Straits Settlements	Tin, gums, pepper	Tin, gums, spices	138,678,000
Sweden	Timber, iron, grain	Timber, animals, metals	95,446,000
Switzerland	Dairy products, animals, fruits	Silk, cottons, clocks and watches	171,520,000
The Transvaal	Gold, coal, sheep	Gold, coal, wool	37,158,000
Turkey	Tobacco, cereals, fruits	Grapes, silk, wheat	68,602,000
United Kingdom	Textiles, steel manufactures	Textiles, steel manufactures	1,730,147,000
United States	Cereals, cotton, minerals	Cotton, grain, railway supplies	1,392,231,000
Uruguay	Animal products, grain	Meat, hides, grain	33,603,000
Venezuela	Coffee, cacao, animals	Coffee, cacao, hides	14,900,000
Zanzibar	Spices	Cloves	5,185,000

Their Productions, Exports, and Imports

(Based on the Statesman's Year Book, 1904, and Chisholm's Handbook of Commercial Geography)

Principal Imports.	Total Value of Imports.	Principal Ports.	Country.
Cotton, indigo, sugar, tea.			Afghanistan.
Cottons, skins, furniture.	$ 66,557,000	Algiers.	Algeria.
Textiles, agricultural implements	103,039,000	Buenos Aires.	Argentine Republic.
Machinery, cottons, woolens.	202,782,000	Adelaide, Melbourne, Sydney.	Australia.
Wool, cotton, coal, tobacco.	321,792,000	Trieste.	Austria-Hungary.
Foodstuffs, timber, wool	694,632,000	Antwerp.	Belgium.
Cottons, woolens, hardware.	5,940,000		Bolivia.
Foodstuffs, cottons, coal	109,672,000	Rio de Janeiro, Bahia, Santos	Brazil.
Textiles, metals, machinery.	14,249,000	Varna.	Bulgaria.
Steel manufactures, coal, woolens.	241,215,000	Quebec, Montreal, Halifax.	Canada.
Textiles, food products.	164,261,000	Cape Town, Port Elizabeth, E. London.	Cape of Good Hope.
Grain, coal, cottons.	27,367,000	Colombo.	Ceylon.
Textiles, minerals, oils.	47,674,000	Valparaiso, Iquique.	Chile.
Cottons, opium, rice.	218,434,000	Shanghai, Canton.	China.
Cottons, silks, oil.	6,771,000	Chemulpo.	Chosen.
Flour, salt, petroleum.	2,040,000	Barranquilla.	Colombia.
Foodstuffs, dry goods, hardware	4,237,000	Puerto Limon.	Costa Rica.
Textiles, rice, food products	62,135,000	Havana, Santiago de Cuba.	Cuba.
Provisions, textiles, hardware.	150,596,000	Copenhagen.	Denmark.
Cottons, hardware, provisions	2,987,000	Puerto Plata, Samana.	Dominican Republic.
Cottons, manure, hardware.	91,692,000	Batavia, Surabaya.	Dutch East Indies.
Cottons, woolens, hardware.	7,077,000	Guayaquil.	Ecuador.
Cottons, coal, wood.	82,761,000	Alexandria, Port Said.	Egypt.
Wool, raw silk, coal.	1,139,720,000	Marseilles, Le Havre, Bordeaux.	France.
Provisions, raw materials, oil	1,393,386,000	Hamburg, Bremen, Stettin.	Germany.
Cereals, yarns, coal.	28,101,000	Piræus, Patras.	Greece.
Cottons, provisions, beverages.	2,256,000	San José, Puerto Barrios.	Guatemala.
Cottons, sacks, hardware.	5,500,000	Port au Prince.	Haiti.
Manufactured goods, foodstuffs.	13,930,000	Honolulu.	Hawaii.
Cottons, hardware, sugar.	165,455,000	Calcutta, Bombay, Rangoon.	India.
Grain, cotton, coal.	355,149,000	Venice, Genoa, Leghorn.	Italy.
Cottons, fish, flour.	9,742,000	Kingston, Port Antonio.	Jamaica.
Cottons, sugar, hardware.	145,405,000	Yokohama, Nagasaki.	Japan.
Cottons, rice, wine.	8,458,000	Tamatave.	Madagascar.
Hardware, textiles, coal.	75,902,000	Vera Cruz, Tampico.	Mexico.
Cottons, sugar, tea.	10,275,000	Tangier.	Morocco.
Hardware, dry goods, provisions.	63,924,000	Durban.	Natal.
Cereals, iron, textiles.	868,800,000	Rotterdam, Amsterdam.	Netherlands.
Flour, textiles, provisions.	7,729,000	St. Johns.	Newfoundland.
Provisions, metals, textiles.	78,360,000	Christiania, Bergen, Trondhjem.	Norway.
Dry goods, food, hardware.	11,808,000		Orange Free State.
Cottons, flour, provisions.	2,569,000	Panama, Colon.	Panama.
Textiles.	2,332,000		Paraguay.
Cottons, sugar, woolens.	23,836,000	Bushire.	Persia.
Breadstuffs, hardware, cottons.	16,187,000	Callao.	Peru.
Rice, flour, wine.	33,342,000	Manila.	Philippines.
Cottons.	11,976,000	Ponce, San Juan, Mayaguez.	Porto Rico.
Cottons, coal, codfish.	60,044,000	Oporto, Lisbon.	Portugal.
Textiles, metals, hides.	56,669,000	Galatz.	Roumania.
Raw materials, manufactures.	280,800,000	St. Petersburg, Odessa.	Russia.
Cottons, breadstuffs, woolens.	6,868,000	Acajutla, Libertad.	Salvador.
Cottons, metals, woolens.	8,606,000		Servia.
Cottons, sacks, opium.	6,290,000	Bangkok.	Siam.
Grain, cotton, timber.	162,168,000	Barcelona, Cartagena, Malaga.	Spain.
Rice, cottons, opium.	161,682,000	Singapore.	Straits Settlements.
Coal, metal goods, yarns.	125,896,000	Gothenburg, Stockholm.	Sweden.
Foodstuffs, silk, metals.	215,743,000		Switzerland.
Hardware, clothing, provisions.	65,338,000		The Transvaal.
Cottons, sugar, coffee.	107,785,000	Constantinople.	Turkey.
Breadstuffs, meat, cotton.	2,605,950,000	London, Liverpool, Glasgow.	United Kingdom.
Sugar, chemicals, coffee.	1,025,719,000	New York, Boston, New Orleans.	United States.
Food, machinery, textiles.	23,517,000	Montevideo.	Uruguay.
Textiles, hardware, provisions.	8,560,000	La Guaira, Puerto Cabello, Maracaibo.	Venezuela.
Textiles, coal.	5,310,000	Zanzibar.	Zanzibar

INDEX AND PRONOUNCING VOCABULARY

All figures refer to pages; heavier type is used for the more important references, and references to maps are indicated by an asterisk (*).
Authority for pronunciation: Webster's International Dictionary (1904).

Key to pronunciation: ă, as in făte; ā, in prefāce; â, in âir; ȧ, in ȧdd; ä, in fär; á, in grásss; ą, in ąll; a, in fi'nal; ē, in ēve; ĕ, in ĕ-vent'; ę, in ęnd; ė, in hėr; e, in re'cent; ī, in īce; ĭ, in ĭ-de'a; ı, in pın; ō, in rōw; ŏ, in ŏ-bey'; ô, in lôrd; ŏ, in nŏt; ū, in ūse; ŭ, in ŭ-nite'; u, in ŭp; û, in fûrl; ų, in ruḍe; u, in full; ẏ, in pitẏ; ẏ, in flẏ; o͞o, in mo͞on; o͝o, in go͝od; ou, in out; oi, in oil; n-ng, in iṇk.

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THE GEOGRAPHY OF PENNSYLVANIA

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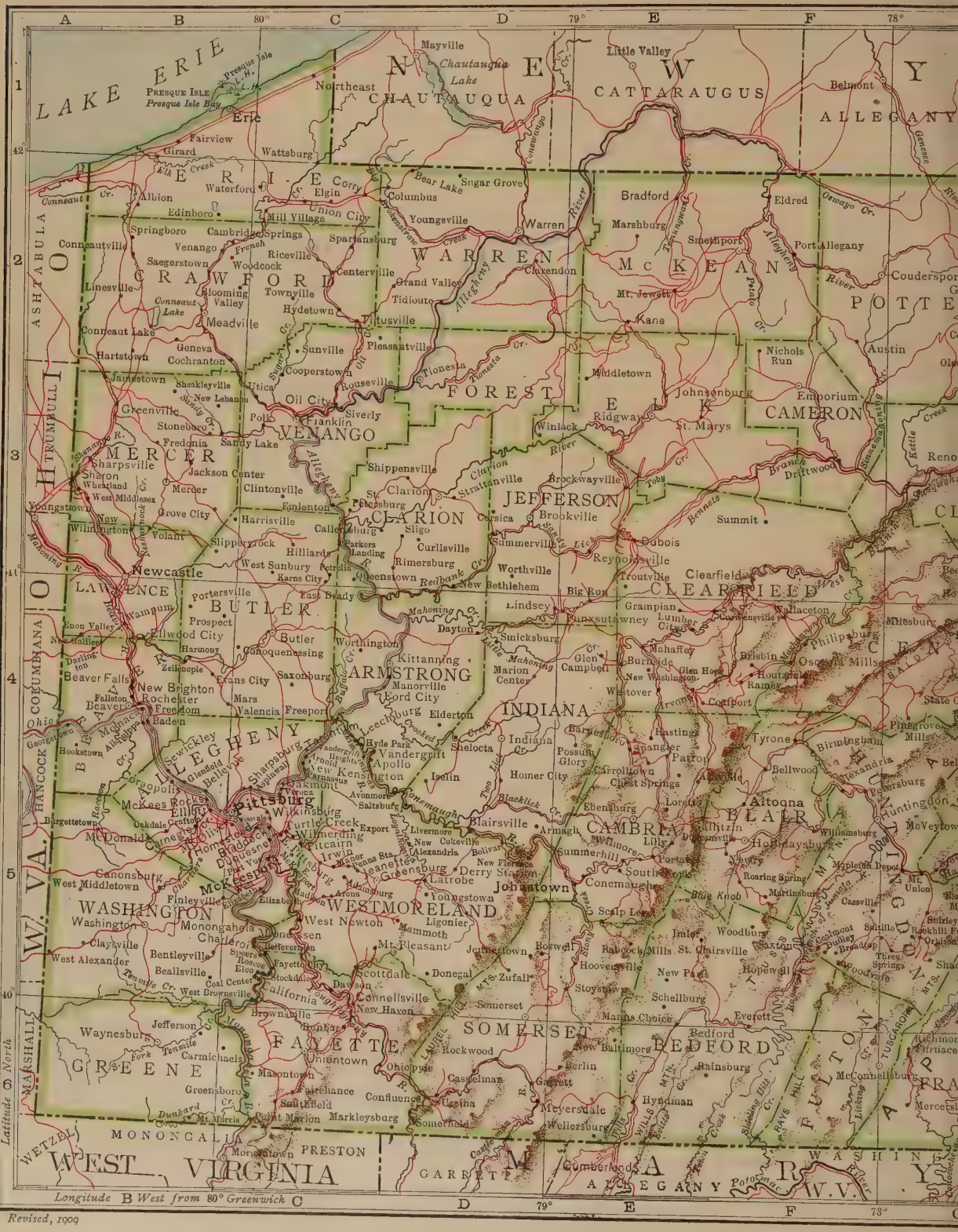
I. PENNSYLVANIA AS A WHOLE

Location. The state of Pennsylvania, one of the oldest and richest of all the eastern states, owes its present position in commerce and manufacturing largely to its geographic position. Extending as it does from the estuary of the Delaware on the southeastern to the Great Lakes on the northwestern side, and embracing, also, direct outlet by water through the Mississippi Valley, the state may justly claim advantages for internal and foreign commerce second to none among the states of the Middle Atlantic coast group.

The unparalleled richness of its mines, the abundant wealth of its forests, the exceeding productiveness of its fertile valleys, and the unrivaled scenery of its splendid mountains and broad plateaus all combine to place Pennsylvania among the first states of the Union.

Size. The most southern boundary of the "Keystone State" lies in 39 degrees 43 minutes north latitude. This boundary is the famous "Mason and Dixon Line," which long separated the free from the slave states. Its northern boundary, 156.9 miles farther north, is on the parallel of 42 degrees 15 minutes north latitude, a little farther north than the most southern part of Ontario. The state's most eastern boundary lies in the Delaware River at about 74 degrees 43 minutes 36 seconds west longitude, while its western boundary is found 302.35 miles west of this point, or in 80 degrees 31 minutes 36 seconds west longitude. Only two slight breaks interfere with the regularity of its boundaries. One of these grew out of conflicting land claims among early settlers, and the other out of a desire to afford larger commercial advantages to the state through the Great Lakes.

Fig. 1. *In the valley of the beautiful "blue" Juniata. Breaking through one after another of a great series of parallel mountain ridges, the pathway of the Juniata winds in and out this celebrated valley marked through nearly its whole length by grand and picturesque scenery.*


LAKE ERIE
PRESQUE ISLE
Presque Isle Bay
Erie
Fairview
Girard
Wattsburg
Northeast
CHAUTAUQUA
Mayville
Chautauqua Lake
Little Valley
CATTARAUGUS
Belmont
ALLEGANY
Waterford
Albion
Edinboro
Springboro
Cambridge Springs
Conneautville
Venango
Saegerstown
Woodcock
Riceville
Linesville
Bloomingdale
Conneaut Lake
Meadville
Geneva
Cochranton
Hartstown
Jamestown
Sheakleyville
New Lebanon
Greenville
Stoneboro
Fredonia
Sandy Lake
Sharpsville
Sharon
Wheatland
West Middlesex
Jackson Center
Mercer
Clintonville
Grove City
Harrisville
Volant
Slippery Rock
New Wilmington
Youngstown
Newcastle
Portersville
Prospect
Ellwood City
Enon Valley
New Galilee
Harmony
Darlington
Zelienople
Beaver Falls
New Brighton
Rochester
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Fallston
Freedom
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Ambridge
Economy
Hookstown
Sewickley
Glenfield
Bellevue
Coraopolis
McKees Rocks
Elliott
Crafton
Oakdale
Carnegie
McDonald
Burgettstown
Pittsburg
Wilkinsburg
Homestead
Braddock
Duquesne
Turtle Creek
Wilmerding
Pitcairn
Irwin
Penn
Manor
Penas Sta.
Jeanette
Greensburg
Latrobe
Derry Station
Canonsburg
West Middletown
Finleyville
Elizabeth
Monongahela
Washington
Claysville
Bentleyville
West Alexander
Beallsville
Coal Center
West Brownsville
Brownsville
Jefferson
Waynesburg
Carmichaels
Greensboro
Mt. Morris
Masontown
Uniontown
Fairchance
Smithfield
Point Marion
Markleysburg
Confluence
Ohiopyle
Cassellman
Casina
Somerfield
Rockwood
Somerset
New Baltimore
Berlin
Garrett
Meyersdale
Wellersburg
Hyndman
Bedford
Rainsburg
Everett
Mann's Choice
Schellsburg
Stoystown
Hooversville
Jennerstown
Boswell
Mt. Pleasant
Mammoth
Ligonier
West Newton
Monessen
Charleroi
Donora
Donegal
Zufall
Scottdale
Connellsville
New Haven
Dawson
Perryopolis
Belle Vernon
Fayette City
Roscoe
Elco
Speers
Stockdale
Deemerton
Scalp Level
Johnstown
Conemaugh
Ebensburg
Loretto
Altoona
Blairsville
Armagh
Summerhill
Portage
Southfork
Lilly
Ashville
Gallitzin
Hollidaysburg
Williamsburg
Martinsburg
Roaring Spring
Blue Knob
Cassville
Mapleton Depot
Mt. Union
Huntingdon
McVeytown
Newry
Woodbury
Imler
Saxton
Bakerstown
Mills
St. Clairsville
Dudley
Belmont
Broadtop
Three Springs
Hopewell
New Paris
Schellsburg
Everett
Bedford
Rainsburg
McConnellsburg
Fulton
Franklin
Mercersburg
Shippensville
Clarion
Strattanville
Brockwayville
Brookville
Summerville
Curllsville
Rimersburg
Worthville
New Bethlehem
Troutville
Reynoldsville
Dubois
Summit
Clearfield
Big Run
Lindsey
Grampian
Wallaceton
Curwensville
Lumber City
Runxsutawney
Dayton
Smicksburg
Kittanning
Manorville
Ford City
Elderton
Worthington
Conoquenessing
Saxonburg
Evans City
Mars
Valencia
Freeport
Leechburg
Apollo
Vandergrift
Hyde Park
New Kensington
Arnold
Parnassus
Tarentum
Natrona
Avonmore
Saltsburg
Delmont
Export
Murrysville
Turtle Creek
Wilmerding
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Manor
Penas Sta.
Jeanette
Greensburg
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Saltsburg
Delmont
Export
Murrysville
Warren
Bear Lake
Sugar Grove
Columbus
Youngsville
Spartansburg
Centerville
Grand Valley
Tidioute
Titusville
Pleasantville
Sunville
Cooperstown
Utica
Oil City
Franklin
Siverly
Polk
Rouseville
Pioneta
Tionesta
Clarington
Sheffield
Kane
Mt. Jewett
Marshburg
Bradford
Eldred
Smethport
Port Allegany
Coudersport
Austin
Nichols Run
Middletown
Johnsonburg
Emporium
Ridgway
Winlack
St. Marys
Cameron
Potter
McKean
Warren
Forest
Venango
Crawford
Mercer
Jefferson
Clarion
Lawrence
Butler
Armstrong
Indiana
Cambria
Somerset
Fayette
Westmoreland
Washington
Greene
Allegheny
Beaver
Huntingdon
Blair
Bedford

of Pennsylvania.

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These boundaries give to Pennsylvania an area of 45,215 square miles, or 28,937,600 acres. (Fig. 2.) In comparative size, Pennsylvania ranks twenty-ninth among the states.

Surface. The eastern United States has five distinct topographical belts extending diagonally across the country from northeast to southwest. (Adv. Geog. Fig. 191.) All the mountains of Pennsylvania are parts of the great Appalachian system, and yet the general surface of the state may be studied under four rather distinct divisions. Properly speaking, the Atlantic Coastal Plain does not come within the limits of the state.

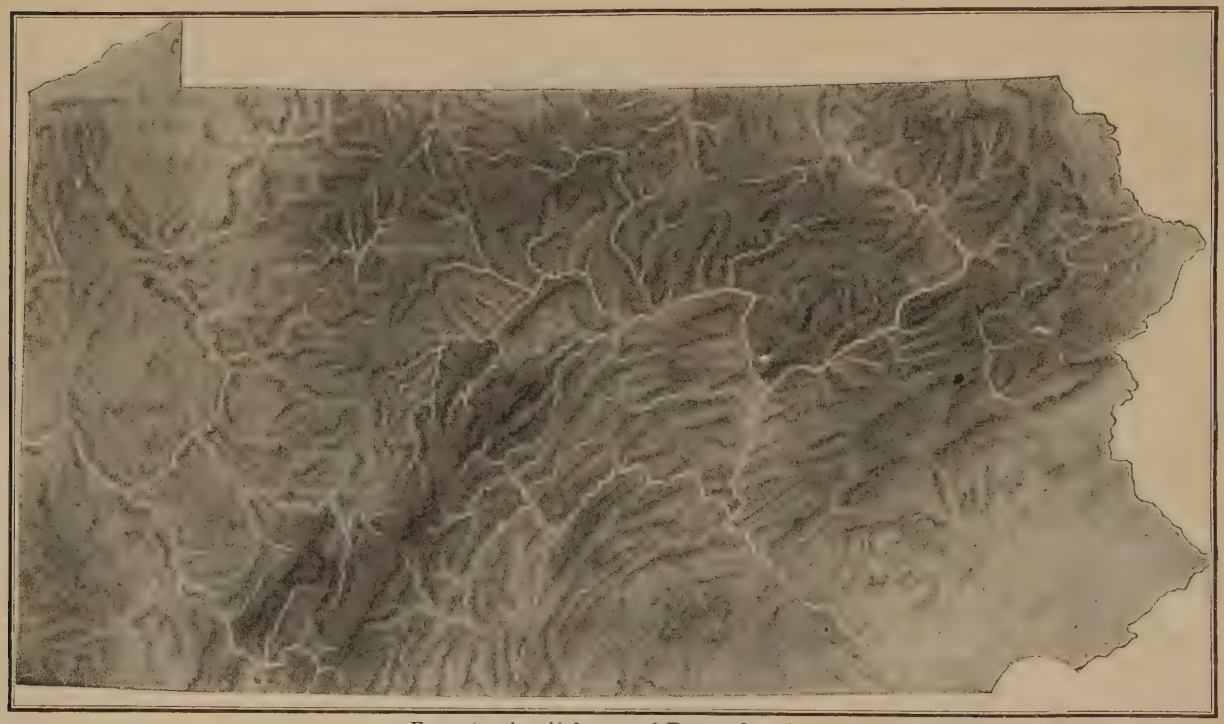


FIG. 3. *A relief map of Pennsylvania.*

The first of these divisions, the *Piedmont Belt*, comprises the southeastern section of the state, or that part lying between the Delaware River and the Blue, or Kittatinny, Mountains. This region has an undulating surface, rising in general elevation from sea level on the banks of the lower Delaware to about 500 feet at the base of the mountains. It is broken throughout by low, irregular ridges, between which lie many beautiful valleys of extraordinary fertility.

The second and third belts in the state's topography, the *Appalachian Mountains* and the *Great Valley*, lie wholly within the main Appalachian system. Locally this division is known as the Allegheny Mountains and includes the Great Valley. It lies directly north and west of the Piedmont Belt, and is the most rugged and mountainous part of the state. (Adv. Geog. Fig. 191.) The mountains, cut and furrowed into numberless spurs, not infrequently rise in abrupt walls 2,000 feet above sea level. The Susquehanna and the Delaware are the only rivers that break through this mountain chain. Throughout almost the entire upper half of the beautiful Susquehanna and its northern tributaries are found rugged mountain walls forming gaps or narrows. The Delaware River, by cutting diagonally across the Appalachian system,

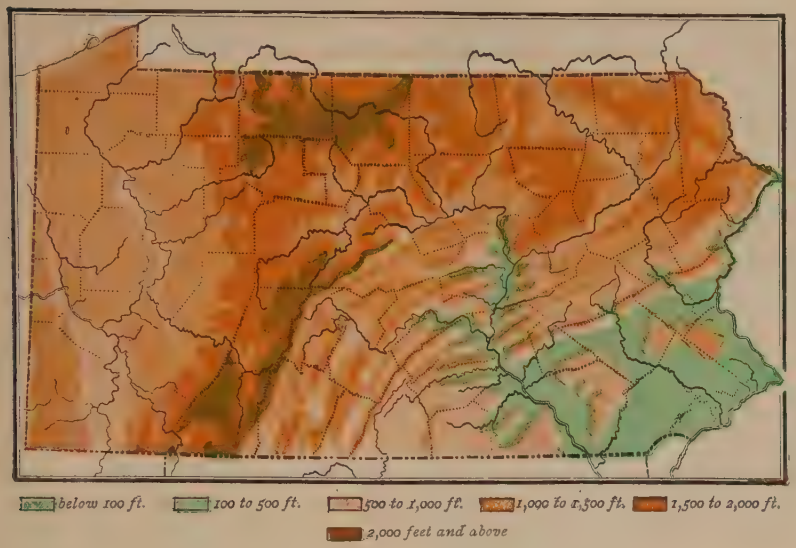


FIG. 4. *A physical map of Pennsylvania.*

forms, in the extreme northeastern corner of Monroe County, the famous Delaware Water Gap. Magnificent scenery surrounds this remarkable gap where the Delaware has pierced the Kittatinny Range (Fig. 7), and the extreme beauty and varied attractions of the locality have made it a noted summer resort. Together with the famous Mount Pocono region, it has become the summer playground for hundreds of tourists.

The extraordinary wealth of coal deposits and the dense forests of valuable timber in the rugged areas of this section attracted a great army of toilers, and to-day this portion of the state is industrially of vast and increasing importance.

Within this section, too, the most fertile land is found. Here are those wonderfully productive areas, Lancaster, Lebanon, and Cumberland valleys, the pride of the state. These form a part of the Great Valley (Fig. 5), which is, however, more distinct as a valley to the north in New York and to the south in Maryland and Virginia. To these rich farming districts, seconded by the vast mineral deposits, Pennsylvania owes her great industrial supremacy.

Beginning a little west of the center of the state, the mountains take on the nature of a high, rolling table-land, known as the *Allegheny Plateau*, broken by ranges of irregular hills, intersected in every part by small, irregular, transverse valleys. (Adv. Geog. p. 136.) This forms the fourth topographical section. We have now crossed the Appalachian divide and are approaching the Ohio boundary. Here the mountainous nature of the country rapidly disappears. The surface is rough and is composed of many irregular hills, all indicating that we are passing into the western foothills of the Alleghenies.

This entire western section, which has a general altitude of from 1,000 to 2,500 feet above sea level, has been much reduced by erosion, and everywhere is broken by short river valleys. The highest point in Pennsylvania is Blue Knob, in Bedford County, with an altitude of 3,136 feet. (Fig. 4.)

FIG. 5. *A scene in the Great Valley. Here the beautiful tributary valleys, usually underlaid with limestone, are of great fertility and form some of the most famous garden spots in the United States.*

Drainage. The topography of a country determines largely the value of the streams to its industrial and commercial life. In many parts of Pennsylvania the rapid current of the streams has always afforded abundant water power for many large industrial plants. (Fig. 8.) In other sections, notably so in the case of the Allegheny and Monongahela valleys, there is little natural power, yet by means of an expensive system of dams and locks an excellent system of navigation is secured, by which commercial interests are greatly enhanced.

FIG. 6. *Glen Onoko Falls in a mountain ravine near Mauch Chunk. The waters descend in a series of cascades about 900 feet.*

There are at least six distinct drainage areas in Pennsylvania. Beginning in the east, we have the Delaware, which forms the eastern boundary, and, with its main tributaries, the Lehigh and the Schuylkill, drains the eastern slope. Proceeding westward into the heart of the Appalachians, we reach the grandly picturesque region (Fig. 6) of the historic Susquehanna; its tributaries, known locally as the North (Fig. 9) and West branches, uniting at Northumberland, form the main river. This stream, rising in New York, zigzagging across the entire breadth of the state from north to south, and entering Chesapeake Bay near the southern boundary, drains nearly one-half the total area. About thirty-five miles south of Northumberland the Susquehanna is joined by the far-famed, "blue" Juniata (Fig. 1), which, through numerous small tributaries, takes its rise in the heart of the Alleghenies. Besides these there are the Genesee, Potomac, and Ohio rivers, with their many small affluents, together with certain insignificant streams flowing into Lake Erie. Of these, the Ohio, formed by the union of the Allegheny and the Monongahela at Pittsburg, is the most important.

FIG. 7 *The Delaware Water Gap. The walls of this narrow gorge, through which the Delaware passes, rise 1,000–1,500 feet higher than the water.*

FIG. 8. *Wallenpaupack Falls near Hawley. Near by glass and silk industries have sprung up, attracted by the power afforded by these falls.*

The Delaware is navigable for ocean steamers of the largest draught to Philadelphia, and smaller craft may ascend to the head of tide water at Trenton, N. J. The Lehigh, Schuylkill, and Susquehanna are not navigable for any considerable distance. (Fig. 3.)

The Geological Story. The present surface and soil of Pennsylvania have a long, long history. This record extends backward over many millions of years to a time when much the larger portion of North America was covered by long projecting arms of the sea. Portions of Pennsylvania's present surface are, it is believed, parts of one of the oldest lands of North America. That is, these land masses were among the first to emerge from the great sheet of waters that at one time covered all the land areas. In the southeastern part of the state is a belt of old, old rocks about fifty miles wide. They are called the Archæan (ancient) rocks. Two principal exposures of these old rock formations are found in Pennsylvania. One forms the hill country around Philadelphia, the other the base of the South Mountain chain.

FIG. 9. *Profile Rock, North Branch Susquehanna River.*

Passing over the eastern mountain walls, immediately upon their western slopes we reach an entirely different chapter in the "book of time." This series of rocks is known as the Palæozoic, or age of old life. It marks the beginning of a new era, the most distinct in the history of the world. It covers almost the entire remaining part of the state. In many places, as in the Allegheny Plateau, the strata lie nearly horizontal, but in the main axis of the Appalachian system they are much tilted, folded, and broken. In the higher ridges are found the hardest sandstones, while upon the valley floors are found in great abundance the softer limestones.

FIG. 10. *A terminal moraine (Adv. Geog., p 63), in the glaciated area of the Delaware Valley. (Adv. Geog., Fig. 180.)*

Most interesting, perhaps, in the geological story of Pennsylvania is that period known as the Carboniferous. In this wonderful period were accumulated, and in its strata were preserved, fully nine-tenths of all the coal in the world. In the carboniferous areas of the eastern Appalachian valleys, where the coal seams were subjected to the greatest changes by the repeated folding and crushing action during the great upheaval, are found the marvelous deposits of Anthracite or hard coal, while in the great western plateau, where the strata were practically undisturbed, bituminous or soft coal is found. All the coal-bearing rocks consist of alternations of sandstones, shales, and limestones interbedded with seams of coal and beds of iron ore. Beneath every coal seam there is always a thin layer of clay called the "under clay," and above is sometimes found a shale, called a black or roof shale. Usually there is one foot of coal to about fifty feet of rock. In many parts of the state, notably in the western and southwestern sections, the deep underlying Devonian sandstones are charged heavily with petroleum and natural gas.

Climate. The state has a varied climate. The low-lying southeastern section is, for the entire year, considerably warmer than are the more elevated northern and western uplands, a difference so marked that variations of from one to three weeks are common in the harvesting of crops. In Philadelphia the mean temperature for January is about 30 degrees, and for July 76.2 degrees. (Fig. 12.) For Wilkes-Barre, among the mountains, the corres-

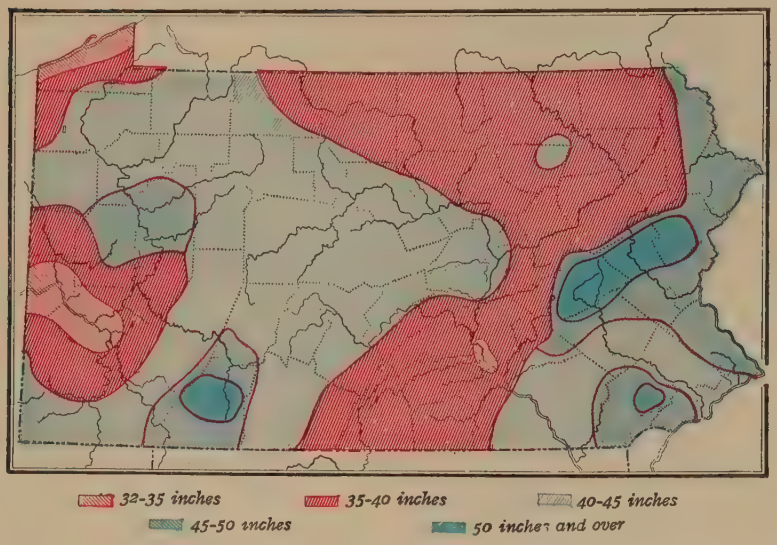


FIG. 11. *The distribution of the annual rainfall over the counties of Pennsylvania from 1898 to 1904.*

ponding figures are 26 and 71 degrees, for Pittsburg, 31 and 76 degrees, and for Erie, on the lake shore, 26 and 70 degrees. Summer heat in various sections reaches 107 degrees, and quite often is prolonged far into the autumn. Snow in some of the northern counties falls to the depth of from one to four feet, and remains on the ground from three to five months. Here the temperature at times reaches 35 degrees below zero. The average annual rainfall for the entire state is 44.5 inches and is very evenly distributed both as to amount and season. (Figs. 11, 13, and 15.) The growing season for all kinds of farm crops is dependent upon the earliest and latest killing frosts. In Pennsylvania, these extremes vary from five and a half or six months in the northern parts, to six and a half or seven months in the southern sections.

Forests and Forest Products. The plateau, together with the middle section of the state, originally was the region of dense pine and hemlock forests. Besides these, an abundance of white oak, hickory, chestnut, walnut, and cherry grew in the lower altitudes; in the middle altitudes were found pitch pine, maple, beech, and black and yellow birch; and in the highest altitudes of the state, black and red spruce, balsam, fir, and larch. With this wealth of forest Pennsylvania for more than half a century has stood among the first states in the value of lumber and timber products. (See Figs. 14, 15, and 45.) Although very nearly 23,000 square miles are still counted as forested, yet much of all the really valuable timber has been removed. However, there are, in certain sections of the state, considerable areas of virgin forest. Because of its abundant supply of hemlock timber and because of the value of hemlock bark in the tanning of hides, Pennsylvania, for many years, led all the states in the manufacture of leather.

A little careful foresight fifty years ago would have husbanded for the state great

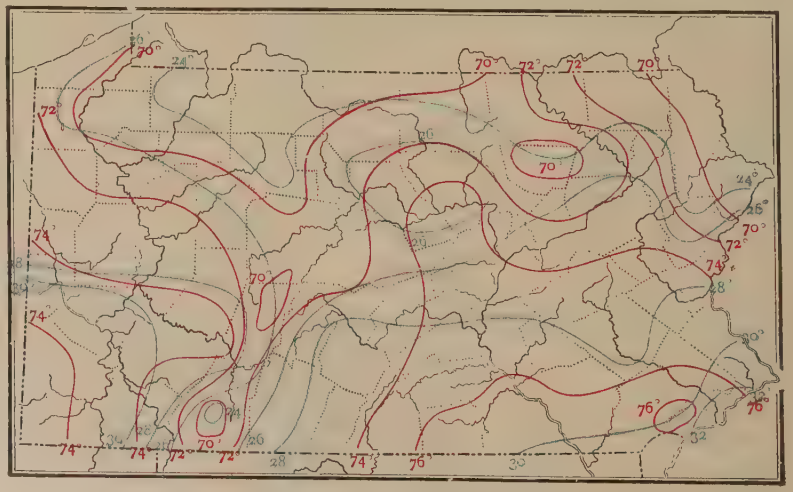


FIG. 12. *The mean temperature of Pennsylvania in January and July.*

FIG. 13. *The mean annual rainfall at Erie from 1891 to 1905.*

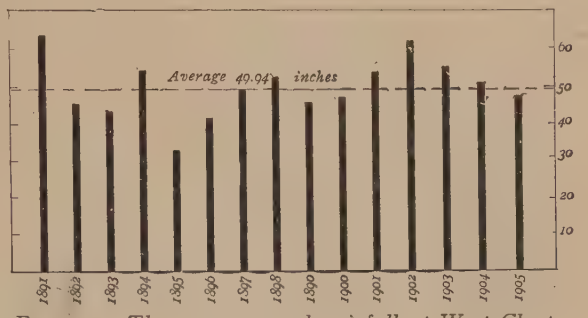


FIG. 15. *The mean annual rainfall at West Chester from 1891 to 1905.*

preserves of profitable forested lands. To-day the bleak, barren sides of nearly all the mountains within the state are a most impressive reminder of the inconsiderate depletion of the timbered areas of the state.

Recently, however, through the State Forest Commission, Pennsylvania has taken active measures for the restoration and preservation of her forests. In order to conserve the water supply, provision has been made for the purchase of three forest reservations, of not less than 40,000 acres each, at the head waters of the three principal river systems. The lands in these holdings will amount to more than 600,000 acres. In 1901 the Bureau of Forestry, formerly a branch of the Department of Agriculture, was erected into an independent department. During 1903 an act was passed for the erection of buildings for a school of forest wardens, and the establishment of a sanatorium for consumptives upon the Mont Alto reservation.

FIG. 14. *A virgin forest of white pine. Hemlock and white pine are now the chief merchantable species.*

Animal Life. The early settlers found in the virgin forests of Pennsylvania many varieties of animal life. Bears, wolves, foxes, deer, panthers, otters, porcupines, beavers, raccoons, and various other species abounded. The woods and streams were filled with turkeys, ducks, geese, and pigeons and the

FIG. 16. *Forest of hemlock and hardwoods. To-day the areas of virgin forest are found chiefly in Huntingdon, Sullivan, Potter, Elk, Pike, and Juniata counties.*

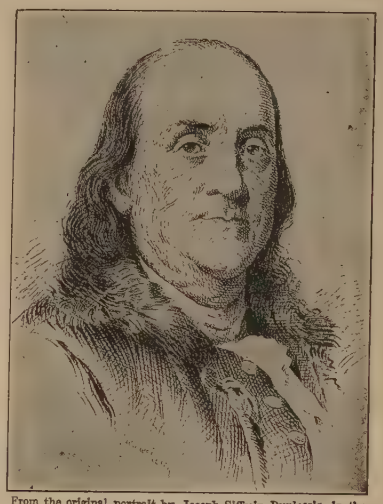
streams held almost endless varieties of fish. Now the larger game has practically vanished, and the lesser game, the song and other birds are saved to the state only by the protection of the law. Pennsylvania now maintains a large and well-nigh perfect system of hatcheries. Here shad, trout, black bass, and other varieties are produced in large numbers and distributed among the head waters of the tributary streams of the state.

From a painting in the rooms of the Historical Society of Pennsylvania, presented by his grandson.

FIG. 17. *William Penn, the founder of Pennsylvania, at the age of 22.*

History. The first actual settlement recorded within the present limits of Pennsylvania was made by Johan Printz, who, with other colonists, in 1643 founded New Gottenberg, on Tinicum Island. On March 4, 1681, William Penn (Fig. 17), in return for a debt of £16,000 owed his father, Admiral Penn, by Charles II, secured a grant of the territory west of the Delaware River, lying between 40 and 43 degrees north latitude, and extending west five degrees. In this grant Penn was given full rights both as to the ownership and to the government of the land.

Difficulties growing out of the Delaware boundaries continued until 1732, when the sons of Penn and Lord Baltimore came to an agreement. Their boundary lines were to follow the present western boundary of Delaware northward tangent to the twelve-mile circle about New Castle, Del., to a point just fifteen miles south of the latitude of Philadelphia. In describing the twelve-mile circle about New Castle, the court house in that city was taken as the center. On the west this arc became tangent to the boundary of Maryland at a point about five miles south of the northeast corner of Maryland, and thus was formed the famous little triangle in Pennsylvania's area, which is a part of London, Britain Township, Chester County, and contains about 800 acres. While all the people within this triangle are citizens of Pennsylvania, their voting is done in Delaware, and all crimes committed within this area are tried in Delaware courts and punishments are imposed in accordance with the laws of Delaware.



From the original portrait by Joseph Siffrein Duplessis in the Museum of Fine Arts, Boston.

FIG. 19. *Benjamin Franklin, statesman, diplomat, philosopher, author.*

Finally, in 1763, all boundary difficulties were adjusted. A survey was made by Charles Mason and Jeremiah Dixon, two noted English mathematicians and surveyors, and the line thus established has since been known as the Mason and Dixon Line.

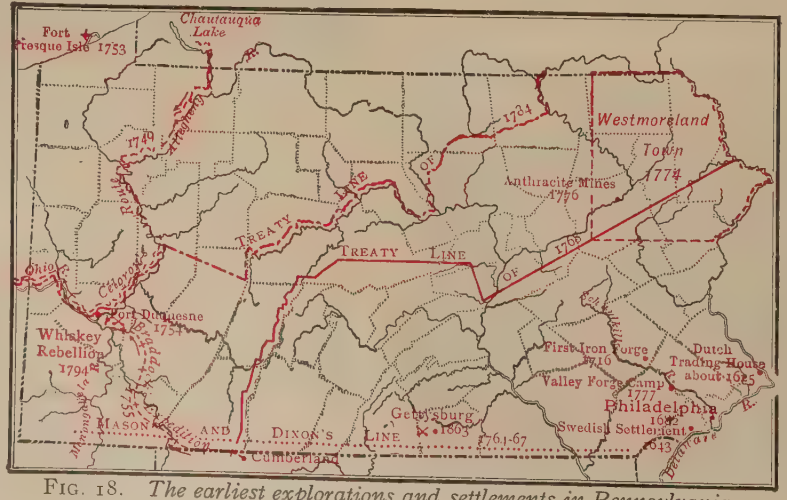


FIG. 18. *The earliest explorations and settlements in Pennsylvania.*

Conflicts growing out of disputes over land boundaries were frequent, and many of them were quite serious. The trouble at Fort Duquesne with the French in

1775, the Pennsylvania War about 1764, and the Wyoming Massacre in 1778 (Fig. 65) were among the most bitter contests. (Fig. 18.) At the close of the Revolutionary War Pennsylvania enjoyed commercial supremacy in the colonies. This, together with the fact that when the thirteen colonies were formed into the Thirteen Original States the group had somewhat the shape of an irregular arch and that Pennsylvania was almost central in this arch, probably led to its being called the "Keystone State."

FIG. 20. *Valley Forge. Famous as the site of Washington's encampment in the winter of 1777–78. On the heights above may still be seen the remains of defensive ramparts.*

A Provincial Congress first met in July, 1774, at Philadelphia. A Provincial Convention in 1775 authorized the preparation of defence for the colony. The first state constitution was drawn up September 28, 1776, and provided for a Supreme Executive Council, one Legislative House, and a Board of Censors. The rapid growth and consequent prosperity of the state gave rise to various forms of unrest. The revolt known as the Whisky Rebellion, suppressed in 1794, grew out of a difficulty with the Scotch-Irish regarding the Federal excise tax.

Pennsylvania's part in the Civil War was most commendable. Five companies of her troops were the first to arrive in Washington, D. C., under President Lincoln's call for volunteers, April 5, 1861, and twenty-five regiments were formed in less than one month. The state was invaded three times, twice at Chambersburg, and once by General Lee's army when the decisive battle of the war was fought at Gettysburg.

FIG. 21. *Independence Hall, Philadelphia.*

FIG. 22. *Interior of Independence Hall. In this room was signed the Declaration of Independence.*

Since the Civil War the most notable thing in connection with Pennsylvania has been the marvelous development of her natural resources. To-day the coal, oil, and steel industries of the state are unparalleled in the world. Out of this perhaps too rapid

growth have arisen many serious labor troubles, generally taking the form of lockouts or strikes. The most desperate were the strike of the railroad employees at Pittsburg, in 1877; the Homestead strike at the Carnegie Company's Mills, July 6, 1892; and the coal miners' strike in the Hazelton region in 1902.

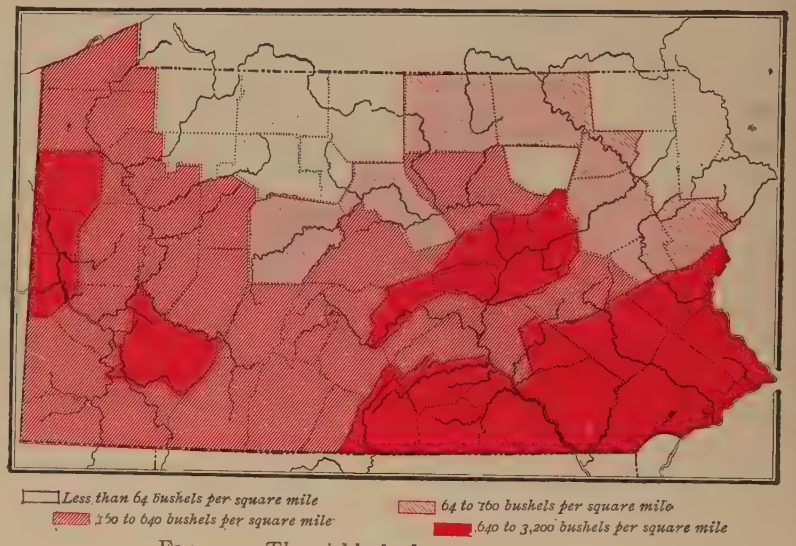


FIG. 23. *The yield of wheat per square mile.*

Industries. No other state has been so favored in natural resources as Pennsylvania. The raw materials for many kinds of manufactures have always been abundant. In the production of lumber, tan bark, tobacco, cereals, crude petroleum, limestone, and slate, the state stands among the first. But the controlling industries of Pennsylvania have always centered about its mines of coal and iron. These are the chief sources of its wealth and prosperity.

Agriculture. Pennsylvania leads all the Atlantic Coast States in agriculture. The part of the state comprised in the counties of Delaware, Chester, Bucks, Montgomery, Northampton, Lehigh, Berks, Lebanon, Lancaster, and York ranks among the most productive sections, agriculturally, of the United States. Large crops of almost all staple farm products are harvested annually. The well-kept farms, the large brick dwellings, and the great bank barns all combine to tell of the prosperous condition of this region. (Fig. 29.) Among the six wealthiest agricultural counties of the United States, Lancaster County, Pennsylvania, easily stands first in the list. The money value of the products for this county alone for the year 1900 was $9,210,800. The many arable and highly fertile valleys even in the remote mountain sections render it possible to engage in farming more or less extensively in nearly every part of the state. About 65 per cent of all the state's area is included in farms, and about 68 per cent of this is improved. There are about 224,248 farms in the state, fully 74 per cent of which are operated by the owners. The average size of the farms has decreased steadily since 1850. Then the average

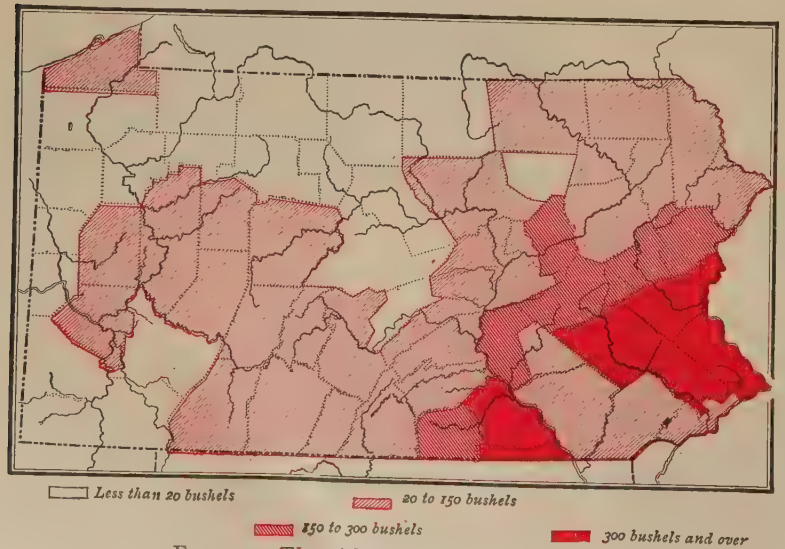


FIG. 24. *The yield of rye per square mile.*

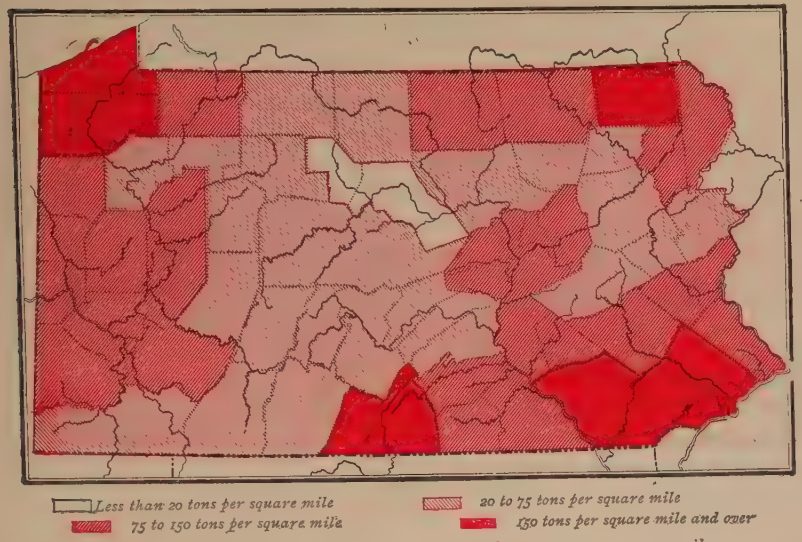


FIG. 25. *The production of hay and forage per square mile.*

alone of the eastern states surpasses it in acreage and production. Climate and soil conditions encourage the growth of grass, and in 1905 only New York and Iowa excelled Pennsylvania in production of hay. (Fig. 25.) At the same time the value of Pennsylvania's crop was more than double that of Iowa. Tobacco is a profitable crop in Pennsylvania and is a considerable factor in her agricultural resources. In 1904 there were raised 18,600,000 pounds valued at $1,658,500. (Fig. 26.)

Pennsylvania's farms, together with their improvements, including buildings, have a value of $898,272,750. If to this we add the value of implements, machinery, and live stock, we have a total of $1,051,629,170

In the distribution of agricultural products within the state one of the most vital questions is the accessibility of the sources of supply to the markets. The great dairy farms that daily send to the cities thousands of gallons of milk together with tons of butter and cheese, dressed poultry, and pre-

farm contained 116.9 acres, as against 86.4 acres in 1900. This reduction in acreage has been highly conducive to better farming, and consequently to larger harvests. (Fig. 27.) These conditions have increased the success of farming and have given our rural population a freer and more prosperous life, which make always for a better type of citizen and a broader and more loyal patriotism.

The soil and climate of Pennsylvania are exceedingly favorable to the growth of cereals, so that in this branch of agriculture the state takes high rank. Pennsylvania yields more than twice as much corn and four times as much wheat as New York, her closest rivals among the Atlantic Coast states being Georgia in corn and Maryland in wheat. The wheat crop for 1904 exceeded 21,000,000 bushels. (Fig. 23.) She ranks first among these states in oats, and, in the production of rye (Fig. 24), has nearly one-sixth of the total crop of the United States. Potatoes form one of the chief money crops of the state. New York

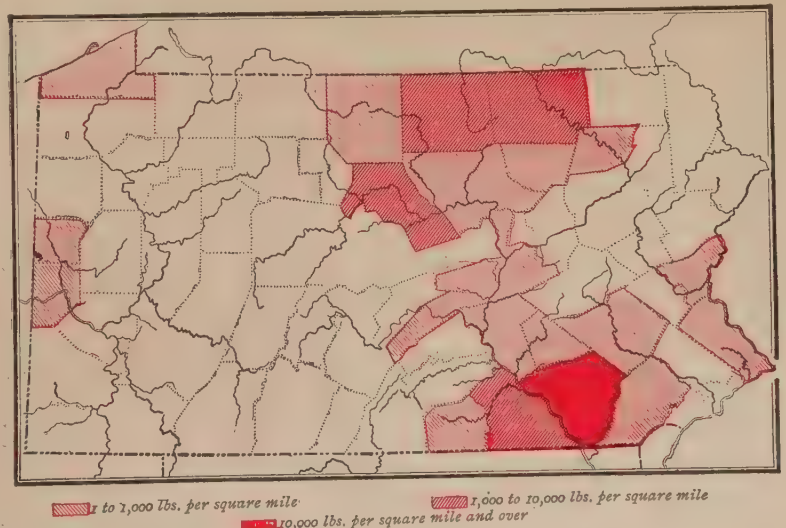


FIG. 26. *The production of tobacco per square mile.*

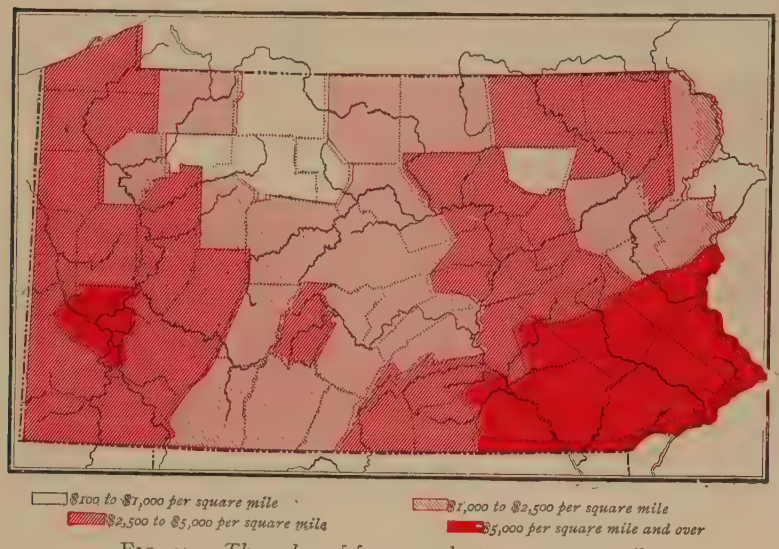


FIG. 27. *The value of farm products per square mile.*

pared meats of all kinds, must be within a few hours by rail of each morning's market.

The demand for all kinds of food-stuffs made by large cities upon the farming districts lying within easy reach is very great. For Philadelphia, a very considerable portion of all the nearby counties is taxed to their utmost to supply the city's daily demands for food from farm and garden. The fertile lands of New Jersey lying along the Delaware, too, contribute daily large quantities of food-stuffs for the city's consumption. What is true of Philadelphia is proportionally true of Pittsburg, or of any other great city.

Horticulture. Among fruit producing states Pennsylvania ranks third in value of products (Fig. 28), being one of the largest producers of orchard fruits in the country. Fully 65 per cent of her fruit trees are apple. Among apple producing states, New York and Pennsylvania lead, each state in 1900 reporting an apple crop of more than 24,000,000 bushels, with New York only slightly in advance.

Stock Raising. Much of the state's surface that is too hilly or mountainous for profitable tillage is admirably adapted to stock raising and dairying, and these are important industries. Every decade since 1850 has witnessed a large increase in the number of dairy cows in the state. Now only four states have a larger number than Pennsylvania. The sale of milk alone in 1901 returned to the state $1,724,000, while from butter the receipts were nearly $10,000,000. In the production of cheese Pennsylvania ranks fifth among the states. The number of stall and grass fed cattle, hogs, and sheep prepared for the markets of the state amounts each year to hundreds of thousands.

Poultry Raising. The farmers of Pennsylvania are realizing that poultry raising may be made a source of much revenue and profit, the state now ranking sixth in value of poultry and third in value of eggs produced. On the farms of the state in 1900 were raised 10,553,100 chickens, 260,000 turkeys,

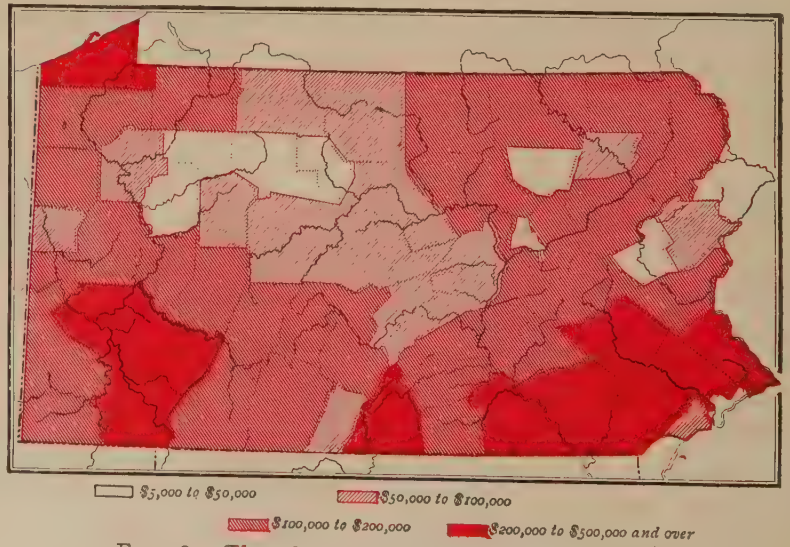


FIG. 28. *The value of fruit products per square mile.*

FIG. 29. *A characteristic farm scene in the heart of the far-famed Cumberland Valley.*

61,000 geese, and 171,000 ducks, the total market value of which, June 1, 1899, was approximately $4,500,000. The farmers marketed, in 1899, 67,000,000 dozen eggs having a money value of $9,080,725, an average price at the farm of thirteen and one-half cents per dozen. In 1900 there were about 17,000,000 dozen more eggs marketed in the state than in 1890, a gain of about 34 per cent.

Mineral Resources and Mining. Pennsylvania outranks all other states in value of mineral products. Practically one-half of all the coal mined in the country comes from the "Keystone State," and more than one-fourth of the total value of the mineral products for the United States is contributed by Pennsylvania. The Appalachian coal fields cover almost the entire western slope of the Appalachian chain from northern Pennsylvania southward into Tennessee and Alabama. The fields embrace about 71,000 square miles and are the richest in the world. (Adv. Geog., Fig. 221.) Nearly 16,000 square miles of this area belongs to Pennsylvania, the anthracite fields of the state covering 484 square miles additional. Western Pennsylvania contains large deposits of natural gas and petroleum. In many parts, also, iron is found in the forms of magnetite and brown hematite. Other minerals are iron, zinc, cobalt, nickel, lead, copper, tin, chrome, salt, and soapstone. White marble, slate, many varieties of valuable building stone, and excellent brick and fire clays are found in practically inexhaustible quantities.

FIG. 31. *Shenandoah, a busy center in the Schuylkill coal region. This region forms one of the three great mining districts in the anthracite fields.*

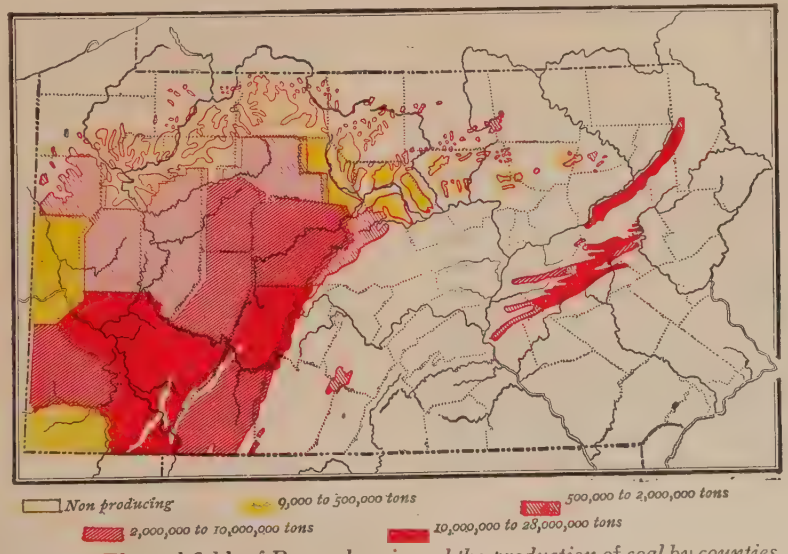


FIG. 30. *The coal fields of Pennsylvania and the production of coal by counties.*

Pennsylvania leads the country in mining, far outdistancing all other states in production of coal, ranking first in natural gas, limestone, sandstone, and slate, and being surpassed in value of petroleum only by Ohio and West Virginia.

Coal. The Pennsylvania annual output of coal exceeds in value that of the total mineral product of any other state, the total yearly tonnage since 1880 being about equal in amount to that of all the other states combined. (Fig. 30.) Pennsylvania produces the only high-grade anthracite in the world. It has been mined since 1820. In 1840 it came into use for smelting purposes, and then the demand for it increased rapidly. The six most productive anthracite counties are Lackawanna, Luzerne, Schuylkill, Carbon, Northumberland, and Columbia. (Figs. 31 and 32.)

FIG. 32. *A coal breaker at an anthracite mine The coal, hoisted from the mine and carried to the top of the breaker, as it descends through the works is crushed, cleaned, and sorted and is discharged into bins or into cars that enter the lower part of the breaker.*

Anthracite burns with little flame but with intense heat, and gives off little smoke, while bituminous or soft coal burns freely with much flame and smoke. Bituminous coal is found in every county north and west of the Allegheny Mountains except Erie. (Fig. 33.) This coal was first extensively used in iron smelting in 1875, and since that time its annual output has far exceeded that of anthracite. In 1874, there were 12,320,000 short tons mined; in 1904, the output of bituminous coal was 97,950,000 tons, worth $94,400,000 at the mines. In 1814 the first shipment of anthracite was made from Carbondale to Philadelphia. Since that date the anthracite mines of Pennsylvania have yielded more than one and a half billions short tons, and the bituminous mines only a little less than that number, the total production amounting to more than 50 per cent of all the coal mined in the United States. (Figs. 34 and 35.)

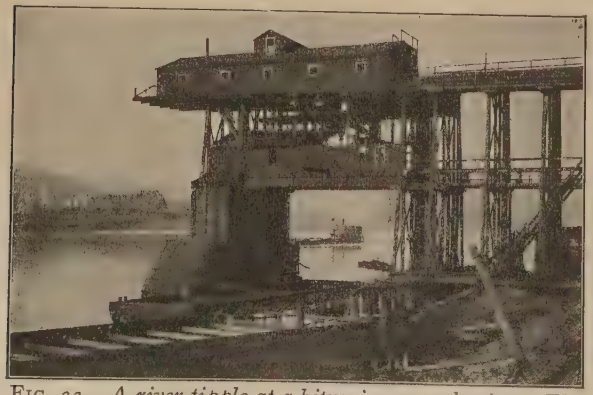


FIG. 33. *A river tipple at a bituminous coal mine. The coal is carried from the mine to the top of the tipple, where it is screened, loaded on dumps, and discharged into barges in the river below.*

FIG. 34. *A characteristic river scene in the coal regions. The barges, loaded with coal, are on their way from the mines to the great industrial centers.*

Petroleum. Petroleum was long known to the Indians of the Alleghenies. The oil was found floating upon the surface of streams and was gathered by the Indians, who sold it as "Seneca oil." Not until 1859, however, was oil known to exist in subterranean reservoirs. Boring for oil was first begun August 6, 1859, and after twenty-two days, and at a depth of sixty-nine feet, oil was "struck." Soon the excitement in the oil fields was as intense as that in California at the time of the discovery of gold. Between

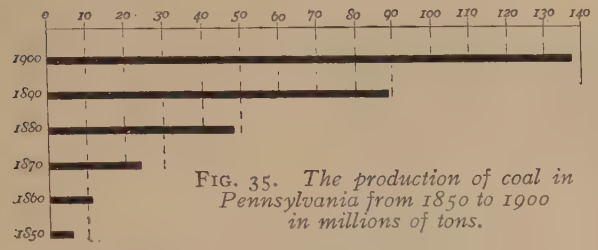


FIG. 35. *The production of coal in Pennsylvania from 1850 to 1900 in millions of tons.*

1860 and 1900 more than 1,000,000,000 barrels of petroleum were taken from the wells of Pennsylvania. (Fig. 37.)

This crude oil is carried by means of boats, railroads, and, more recently, through a system of iron pipes laid underground to the great refineries at Philadelphia, New York City, and Cleveland, where the crude oil is refined into kerosene or coal oil.

Natural Gas. Closely associated with petroleum is natural gas. (Fig. 36.) For a time its production in Pennsylvania was so great that its use for domestic and manufacturing purposes outranked that of coal. In 1904 the value of the natural gas produced in Pennsylvania was nearly one-half that for the entire country, the value of its product being more than double that of West Virginia, its nearest competitor.

Quarrying. In the industry of quarrying valuable building stone Pennsylvania stands without a rival. Both grey and brown sandstones are abundant; the brown, because of its greater durability, is one of the best building stones in the state. All through the valleys of the Juniata and of the North Branch of the Susquehanna these quarries are found. A conglomerate sandstone, very hard and durable, is also found in large quantities. In limestone quarrying the state has no competitor. Two-fifths of the total output is used for flux in furnaces and nearly the same amount is burned into lime, of which the state is by far the greatest producer. Pennsylvania's production of slate is about two-thirds that of the entire country. (Fig. 38.) Of clay and clay products, and Portland cement, Pennsylvania produces nearly one-half the total output for the United States.

FIG. 37. *Shooting an oil well. A typical scene in an oil region.*

Manufactures. If in the state's extraordinary industrial development, the great wealth of raw material is the first factor, the second factor lies in the advantageous conditions for marketing its products. Since 1850 Pennsylvania has ranked second in the United States in manufacturing industries. (Fig. 39.) By far the most important industry is the manufacture of iron and steel, an industry in which Pennsylvania leads the country.

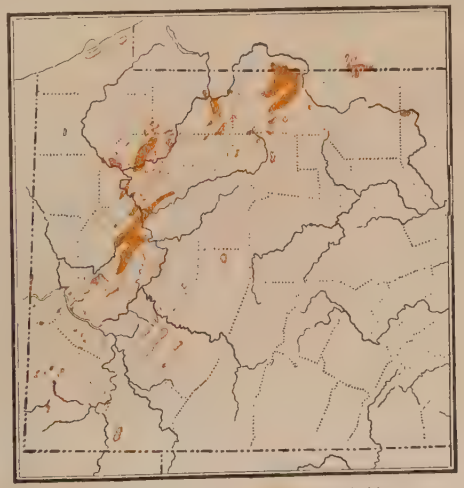


FIG. 36. *The oil and gas fields of Pennsylvania.*

The first stove made in the United States was a "jamb stove," made at Germantown about 1735. The cannon balls used by General Jackson at the battle of New Orleans were cast in Fayette County in 1797. In 1831, about two years after the first locomotive was built in the United States for actual service, locomotive building was begun by a company in Philadelphia as a

FIG. 38. *A slate quarry at Bangor. The slate quarries found here are among the largest in the world.*

regular industry. This pioneer company, which completed "Old Ironsides" in 1832, is still in existence, and is perhaps the largest single industrial establishment in the United States. It is not an incorporated company, but a copartnership. This one company now has a capacity of more than one thousand locomotives a year and an invested capital exceeding $12,000,000.

Among the first Bessemer rails rolled in America were those made in 1867 at Johnstown, Pa. The Johnstown mills, together with those at Steelton, are now the largest producers of Bessemer steel in the world.

The value of the annual production of the iron and steel manufactories of the state exceeds $430,000,000.

The first successful attempt to establish ironworks in Pennsylvania was made in 1716, when a forge was erected on Manatawny

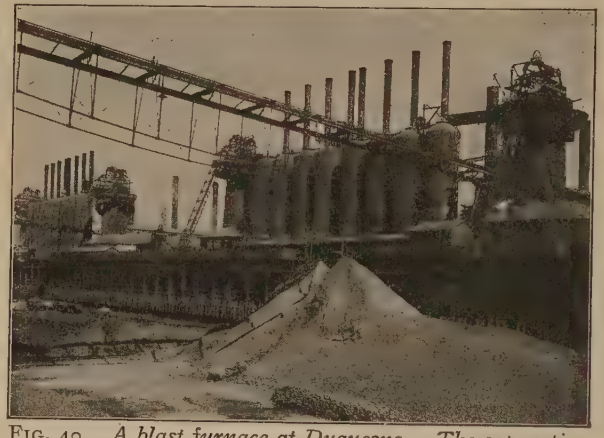


FIG. 40. *A blast furnace at Duquesne. The separation of the iron from the ore in the blast furnace marks the first step in the making of steel.*

Creek in Berks County. The first blast furnace west of the Allegheny Mountains was erected on Jacob Creek, in Fayette County, in 1789, and was "blown" in 1790. Now the greatest centers of this industry are Pittsburg, McKeesport, Duquesne (Fig. 40), Johnstown, Newcastle, and Steelton. Other great industries are the manufacturing of tin and tin plate, and ship building. Textiles of all kinds are manufactured, Pennsylvania ranking second among the states in production. Carpets, hosiery and knit goods, and cotton and woolen goods, and silk and silk goods, are produced in surprisingly large quantities. During the last half century the mechanical industries of Pennsylvania have had a phenomenal growth. The state's population in these years grew from 2,311,786 to 6,302,034, while the annual

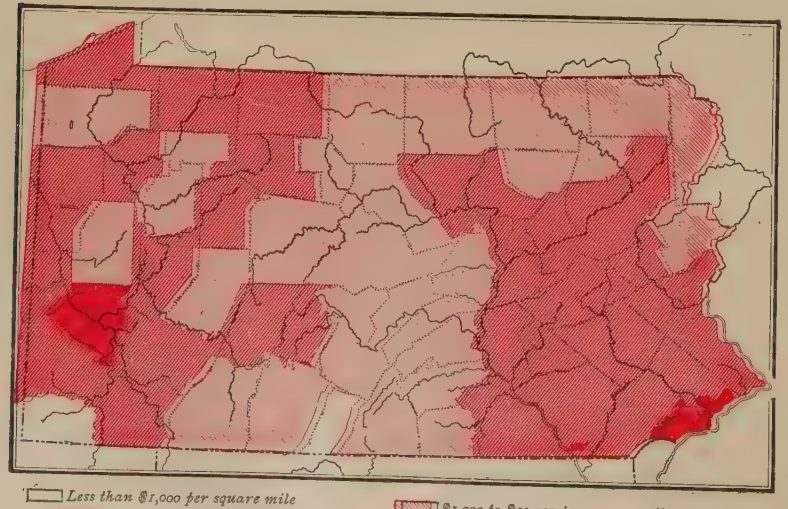


FIG. 39. *The value of manufactured products per square mile.*

average number of wage-earners employed in manufacturing establishments increased from 146,766 to 733,834, embracing, in 1900, 11.6 per cent of the entire population as against 6.3 per cent in 1850. (Fig. 48.)

FIG. 41. *A modern open-hearth furnace. Here iron direct from the blast furnace is being converted into steel.*

The introduction of natural gas as a fuel gave a great impetus to the industrial life of Pennsylvania. This fuel is unequaled in value for the manufacture of glass (Figs. 42 and 43), the puddling of iron, the roasting of ores, and the heating of large furnaces for the manufacture of steel. (Fig. 41.)

In 1900 the commercial value of the products turned out by the plants of the twenty-five leading industries of the state was more than $1,291,000,000.

FIG. 42. *A great glass plant at Jeannette in the natural gas belt. Important manufactures of window, flint, and other glass are centered here.*

In the manufacture of coke Pennsylvania stands alone, the output for the state being fully three-fifths of the entire output for the United States. In 1904 there were at least 15,650,000 tons produced in Pennsylvania. (Fig. 44.) Three-fifths of this, or about one-half the product of the country, was made in the celebrated Connellsville (Fig. 73) district, lying almost wholly in Fayette County.

Coke is made by roasting or burning certain soft coals in specially prepared ovens or retorts. It is used chiefly as fuel in smelting or separating metals from the ores.

Formerly in the manufacture of coke a large percentage of valuable matter was lost, but in the method now employed many by-products are secured. One hundred tons of soft coal will yield seventy-six gross tons of coke, two and three-fourths tons of coal tar, one and one-fifth tons of ammonia sulphate, and about 8,650 cubic metres of fuel gas. The coal tar thus produced is likewise the source of a large number of by-products. From a chemical composition with benzine, many articles of commerce are produced, chief of which are the aniline dyes, naphtha, gasoline, and carbolic acid.

FIG. 43. *An interior view in a glass plant, showing the workmen heating glass at the furnaces.*

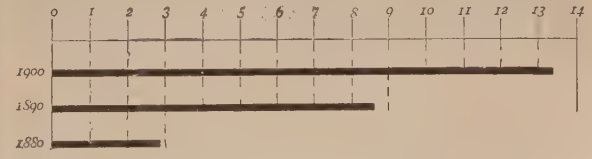


FIG. 44. *The production of coke in Pennsylvania in millions of tons at each census year since 1880*

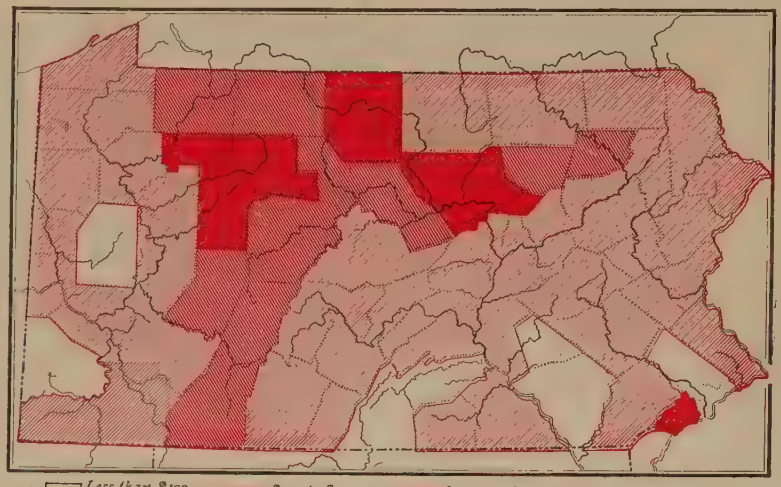


FIG. 45. *The value of lumber and timber products per square mile.*

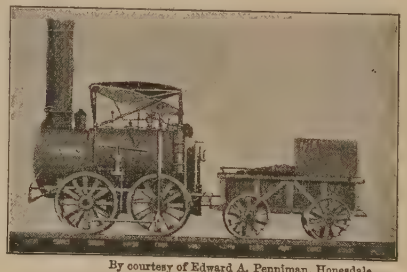
Transportation. At the beginning of the nineteenth century efforts were inaugurated to improve inland transportation for Pennsylvania. The securing of better highways was the first step, and this led to the building of the Philadelphia, Lancaster, and Pittsburg pike. Similar roads, for shorter distances, and many bridges (Fig. 49) also were built. The so-called "National Pike" running through Cumberland, Md., and on to Washington, Pa., it is believed followed the trail of General Braddock's army. A little later more than $50,000,000 was expended in a system of

FIG. 46. *A "limited" train at full speed. These trains cross the state in about seven hours, running at a rate of a little more than fifty miles an hour.*

canals. These almost always paralleled the principal rivers of the state.

Prior to 1848 railroad building progressed slowly, yet at that time Pennsylvania, with about 1,050 miles of road, led all the states. However, the railroads have kept pace with the marvelous growth of the industrial interests of Pennsylvania, and in 1904 there were practically 11,000 miles of railroad within the state. (Fig. 46.)

The first indisputable record of railroad building in the United States is that of a road three-quarters of a mile long constructed by Thomas Deiper, in Delaware County, Pa., in 1809. The second road built in the state was at Mauch Chunk, Pa. (Fig. 6), and was three miles long. These, however, were tramways operated by horses. The first attempt made in the United States to use a locomotive engine for railroading purposes was on a track between Carbondale and Honesdale, Pa. This road, sixteen miles long, was built by the Delaware & Hudson Canal Company. The engine used was built in England. It was named the "Stourbridge Lion." (Fig. 47.) The trial trip was made



By courtesy of Edward A. Penniman, Honesdale.

FIG. 47. *The "Stourbridge Lion," built in 1829. Its speed was about ten miles an hour.*

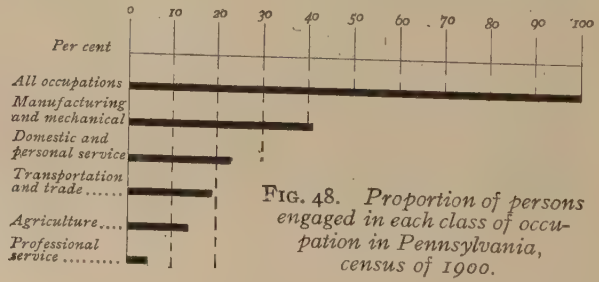


FIG. 48. *Proportion of persons engaged in each class of occupation in Pennsylvania, census of 1900.*

FIG. 49. *One of the quaint old covered bridges over Conodoguinet Creek, Cumberland County. This bridge was completed in 1829.*

August 8, 1829. The engineer who bore a part in this historic trip was Horatio Allen.

One of the most serious problems in the building of railroads is that of securing cross-ties. In Pennsylvania the railroads practically require 300,000,000 cubic feet of timber each year for cross-ties. To this end some of the large companies in the state have secured extensive tracts of land, and are planting thousands of trees.

Pennsylvania has 24.38 miles of track for every 100 square miles of area, or 16.37 miles of track for each 10,000 inhabitants.

The State Government. Pennsylvania is known as the Commonwealth of Pennsylvania. The present Constitution was adopted in 1874. The state is represented in Congress by two Senators and thirty-two Representatives. The state government is divided into three parts—the Executive, the Legislative, and the Judicial.

The Executive department consists of a Governor, Lieutenant-Governor, and Secretary of Internal Affairs, elected for a term of four years, the Auditor-General for three years, and the State Treasurer for two years, the Secretary of the Commonwealth, the Attorney-General, and the Adjutant General, appointed by the Governor at pleasure, and the State Superintendent of Public Instruction, who is appointed for four years.

The Legislative or law-making power is vested in the State Legislature, which is composed of a Senate of fifty members elected for four years, and a House of Representatives of 204 members elected for two years. The Legislature meets biennially at the Capitol (Fig. 51), on the first Tuesday of odd numbered years.

FIG. 51. *The State Capitol at Harrisburg.*

The Judicial department embraces a Supreme Court, consisting of seven judges elected by the people for twenty-one years. Annual sessions are held at Harrisburg, Sunbury, and Pittsburg. Other courts are a superior court, courts of common pleas,

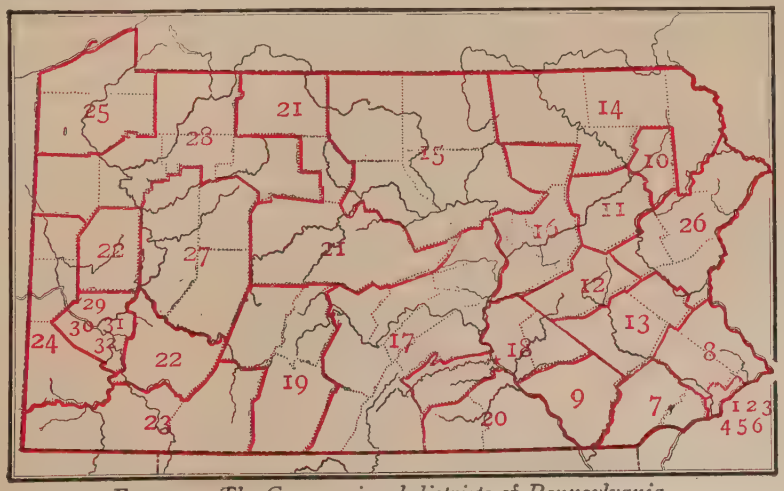


FIG. 50. *The Congressional districts of Pennsylvania.*

of oyer and terminer and general jail delivery, of quarter sessions of the peace, magistrates, and orphans' courts.

Pennsylvania is divided into sixty-seven counties varying greatly in area and population. These counties are divided into cities, boroughs, and townships, each having its own local officers. New counties may be formed only by legislative enactment, but any new county so formed must have at least 400 square miles of territory and not less than 20,000 inhabitants. The more important officers of the county are: commissioner, treasurer, sheriff, prothonotary, clerk of the court, district attorney, jury commissioner, director of the poor, and county superintendent of public schools.

State Charities and Penal Institutions. There are in the state many benevolent institutions for the education of the feeble-minded, the deaf, the dumb, and the blind. The schools for the deaf at Edgewood Park, Philadelphia, and Scranton are especially efficient. State industrial reform schools for boys are established at Morganza, Glen Mills, Huntingdon, and Philadelphia.

At Harrisburg, Danville, Warren, Wernersville, Norristown, and Allentown are state hospitals for the care of the insane; while at Philadelphia and Allegheny are state penitentiaries.

FIG. 53. *A busy scene in the creamery at the State Agricultural College.*

Education. In all departments of education Pennsylvania takes high rank. Her constitution requires that efficient public schools be maintained for the education of all children above the age of six years. The Free School Act dates only from 1834, yet to-day the total annual appropriation to the public school fund is practically $6,000,000. This is by far the largest direct appropriation made by any state.

The public school system of the state is organized under a State Superintendent of Public Instruction, assisted by Directors elected by the people and for each county; a superintendent of public schools, is elected for a term of three years by these directors.

There were in the state in 1903, 1,702,340 children between the ages of five and eighteen, and of these 1,193,669 were enrolled in the public schools. The average daily attendance was 883,865. The total expenditure

FIG. 52. *College Hall, University of Pennsylvania.*

for 1902-3 was more than $24,000,000. In 1904 there were 630 public high schools and 144 private secondary schools. The average cost of schooling each child per month, for 1903, was $2.04, and the total amount paid into the treasuries of the several school districts of the state was $5,584,718.62. The total wages paid the teachers of the state in 1903 was $12,552,491, or an average of $399.16.

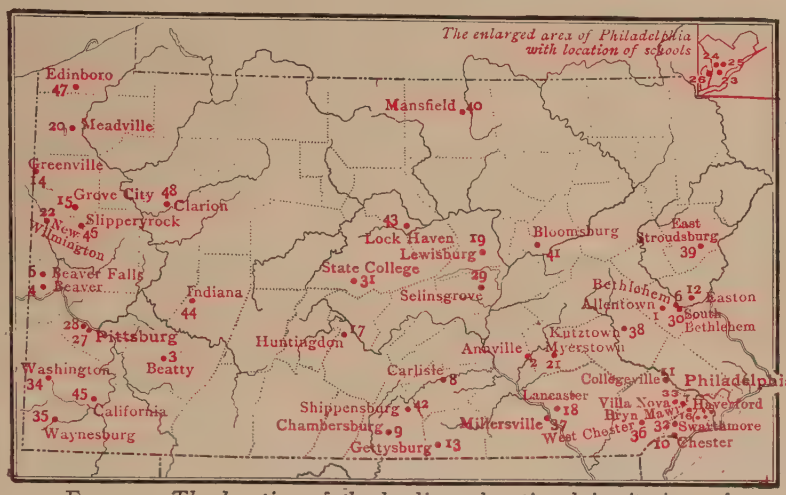


FIG. 54. *The location of the leading educational institutions of Pennsylvania.*

Pennsylvania is divided into thirteen State Normal School districts, each having its own school for the training of teachers. The State Agricultural College is at State College. It provides free tuition in agriculture and the mechanic arts to residents of Pennsylvania. (Fig. 53.) The University of Pennsylvania, which is one of the leading educational institutions in the United States, is located in West Philadelphia. (Fig. 52.) Every department is thoroughly equipped for efficient work. At Pittsburg is the Western University of Pennsylvania. Founded at Pittsburg as the Pittsburg Academy in 1786, it is one of the oldest educational institutions west of the Appalachians. It has become widely known because of the work done at its astronomical observatory. Pennsylvania has, beside the state schools, about thirty schools classed as colleges and universities. (Fig. 54.) At Carlisle, Pa., is located the largest, best equipped, and most efficient school for the education of the Indian in the United States.

THE LEADING EDUCATIONAL INSTITUTIONS OF PENNSYLVANIA

COLLEGES AND UNIVERSITIES

1 Muhlenberg College, Luth., Allentown.
2 Lebanon Valley College, Annville.
3 St. Vincent College and Seminary, R. C., Beatty.
4 Beaver College, M. E., Beaver.
5 Geneva College, Ref. Presb., Beaver Falls.
6 Moravian College and Seminary, Moravian, Bethlehem.
7 Bryn Mawr, Non-Sect., Bryn Mawr.
8 Dickinson College, M. E., Carlisle.
9 Wilson College, Presb., Chambersburg.
10 Pennsylvania Military College, Non-Sect., Chester.
11 Ursinus College, Reformed, Collegeville.
12 Lafayette College, Presb., Easton.
13 Pennsylvania College, Luth., Gettysburg.
14 Thiel College, Luth., Greenville.
15 Grove City College, Non-Sect., Grove City.
16 Haverford College, Friends, Haverford.
17 Juniata College, Ger. Bapt., Huntingdon.
18 Franklin and Marshall, Reformed, Lancaster.
19 Bucknell University, Bapt., Lewisburg.
20 Allegheny College, M. E., Meadville.
21 Albright College. Evang., Myerstown.
22 Westminster College, United Presb., New Wilmington.
23 Central High School, Non-Sect., Philadelphia.
24 Girard College, Non-Sect., Philadelphia.
25 La Salle College, R. C., Philadelphia.
26 University of Pennsylvania, State, Philadelphia.
27 Pennsylvania College, Non-Sect., Pittsburg.
28 Western University of Pennsylvania, State, Pittsburg.
29 Susquehanna University, Luth., Selinsgrove.
30 Lehigh University, Non-Sect., South Bethlehem.
31 Pennsylvania State College, State, State College.
32 Swarthmore College, Friends, Swarthmore.
33 Villa Nova College, R. C., Villa Nova.
34 Washington and Jefferson, Presb., Washington.
35 Waynesburg College, Cumberland Presb., Waynesburg.

PUBLIC NORMAL SCHOOLS

36 State Normal School (1), West Chester.
37 State Normal School (2), Millersville.
38 Keystone State Normal School (3), Kutztown.
39 East Stroudsburg State Normal School (4), East Stroudsburg.
40 Mansfield State Normal School (5), Mansfield.
41 State Normal School (6), Bloomsburg.
42 Cumberland Valley State Normal School (7), Shippensburg.
43 Central State Normal School (8), Lock Haven.
44 Indiana Normal School of Pennsylvania (9), Indiana.
45 Southwestern State Normal School (10), California.
46 Slipperyrock State Normal School (11), Slipperyrock.
47 State Normal School (12), Edinboro.
48 Clarion State Normal School (13), Clarion.

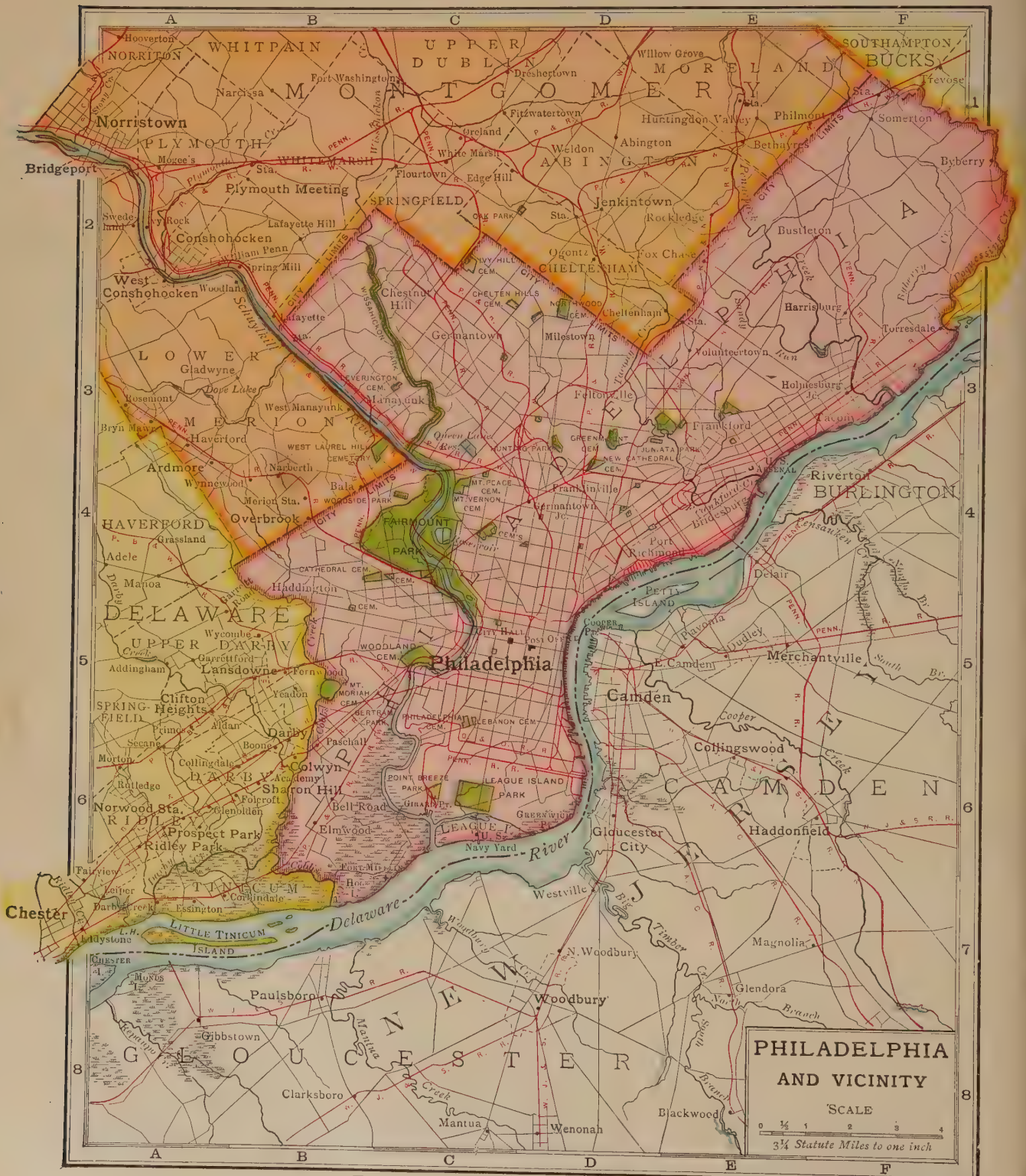


FIG. 55. *Map of the City of Philadelphia.*

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II. THE GROWTH AND DEVELOPMENT OF CITIES.

In Pennsylvania, owing to the vast development of industrial and commercial activities, the population in cities and towns has far outstripped that in rural districts. Indeed, today more than one-half of the population of Pennsylvania is urban. There are in the state 833 incorporated places, and, by the census of 1900, the Commonwealth contains 6,302,115 inhabitants, 3,980,000 of whom live in these places. (Fig. 57.) In comparison, New York has 7,268,894 inhabitants, with 5,640,000 grouped in a total of 458 incorporated places, and Illinois, 4,821,550 inhabitants, 3,205,000 residing in 930 incorporated cities and villages. Pennsylvania's density per square mile is 140 people, which is more than four times the number for the country, though five states, Massachusetts, Rhode Island, New Jersey, Connecticut, and New York, in the order named, exceed it in density. (Fig. 56.)

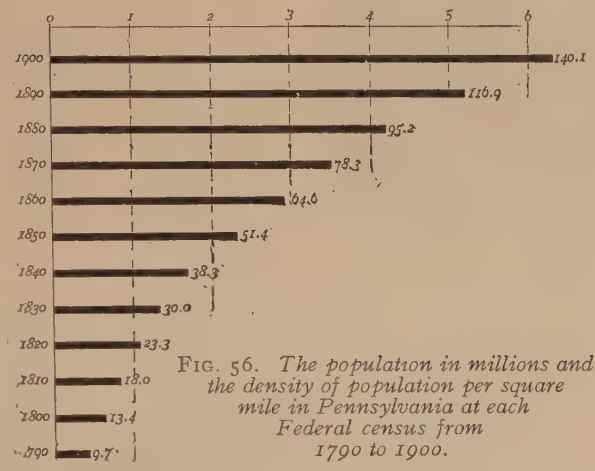

FIG. 56. *The population in millions and the density of population per square mile in Pennsylvania at each Federal census from 1790 to 1900.*

Philadelphia, because of its founder known as the "Quaker City," is now more often called the "City of Homes" because so many of its people own the homes they live in. It is the largest city in the state and the third in the country, only New York and Chicago outranking it. Situated on the Delaware at the head of navigation for the largest ocean steamers, connected by navigable waterways with the great anthracite region, and the center of three great railway systems, it is naturally one of the greatest commercial, manufacturing, and financial centers of the country. (Fig. 55.) Philadelphia is the leading manufacturing center of Pennsylvania, and the total power used exceeds that of any other city in the United States. It is the chief wool manufacturing center of the country and has the largest locomotive works in the world. About one-third of the wage-earners of the state are employed in Philadelphia works, which turn out products equaling in value nearly one-third that of the total for all the manufactories of the state. Foundry and machine shop products, the refining of sugar, molasses, and petroleum, and the making of carpets and rugs, and men's clothing lead in importance. Philadelphia is a great center for shipbuilding, holding first rank in this industry. At immense shipyards in the southern part of the city have been built some of the best known of the great war vessels of the world. (Fig. 59.) Here also, on League Island, is one of the great navy yards of the United States.

A large part of Philadelphia's industrial importance is due to her favorable situation for

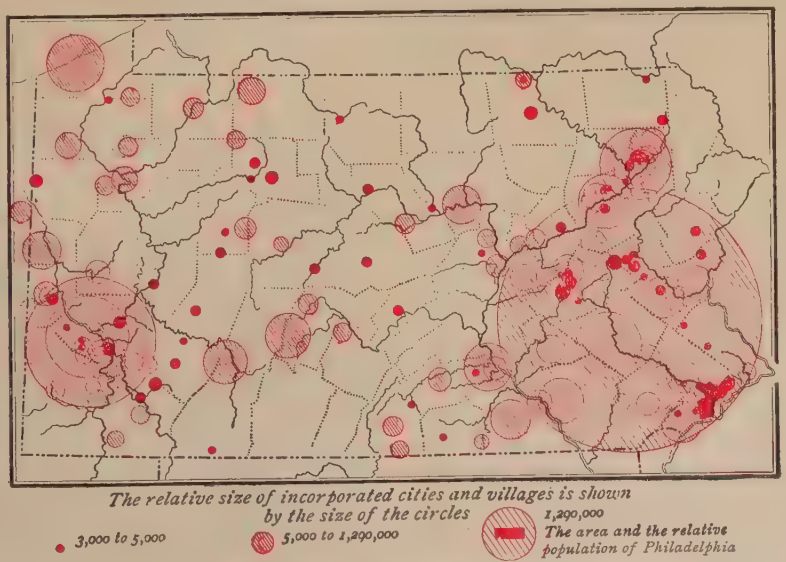

FIG. 57. *The distribution of urban population in Pennsylvania, census of 1900.*

FIG. 58. *Broad Street, Philadelphia, at the intersection of Market. Notice City Hall with its lofty tower, 550 feet high, surmounted by a statue of William Penn.*

commerce. The city, with about twenty miles of frontage on the Delaware, is crossed by the Schuylkill on its way to join that river, and the banks of both streams are fringed with miles of busy wharves. The great depth of water in the Delaware at the wharves affords splendid accommodation for shipping, and here may be seen great ocean steamers from many parts of the world. The city likewise owes much to its superior railroad facilities.

FIG. 59. *Launching of the battleship Maine at the great shipyards on the Delaware, Philadelphia. With the exception of the Clyde River, Scotland, more shipping is built on the Delaware than on any other river in the world.*

Philadelphia, however, is conspicuous not alone for its material advantages. It is famed for its colleges, schools, and libraries, for its honored place in science, in art, and in the learned professions. The great schools of Philadelphia are the University of Pennsylvania, founded by Benjamin Franklin, Girard College, endowed by Stephen Girard, Williams School, and Drexel Institute. Philadelphia has many other educational institutions of high rank, including medical and law colleges, schools of design and art, and conservatories of music and numerous libraries. Among widely known scientific institutions are the Philadelphia Academy of Natural Sciences, famous for its noteworthy and interesting collections, the oldest institution of its kind in America; the Franklin Institute for the promotion of the Mechanic Arts; and the American Philosophical Society, which had for its first president Benjamin Franklin. (Fig. 19.)

The historical records of Philadelphia go back to the earliest annals of our country. Virtually the capital of the Colonies during the Revolution, it was the scene of many notable events connected with the stirring times of that period. Here was the greatest city of colonial days, the seat of the first Continental Congress, and the birthplace of the Declaration of Independence. (Figs. 21, and 22), Designated as the seat of government for Pennsylvania, March 12, 1683, it remained the capital 116 years. The Philadelphia of those days comprised two and one-half square miles; to-day the city covers fully 130 square miles. It now has about 1,100 miles of

FIG. 60. *The Broad Street railroad station, Philadelphia. A fine example of modern Greek architecture.*

finely paved streets, enough, if in a continous line, to reach from the Centennial Building of 1876 to the St. Louis Exposition of 1904. Broad Street is one of the longest and finest thoroughfares in the world. (Figs. 58 and 60.) At its intersection with High, now Market Street, stands the City Hall, a marble building completed after three decades of labor, at a cost of $25,000,000.

The public parks of the city cover a large area, Fairmount Park, the most celebrated, embracing more than 3,000 acres. This park, justly famed for the beauty and loveliness of its natural scenery, is adorned by many fine works of art, notable among these being the imposing statue of Washington, by Siemering, erected in 1896. Here, too, are found a number of houses of historic interest, the estates to which they belonged now forming parts of certain sections of the park. Here may be seen the home of Robert Morris, the financier of the Revolution, and of his friend, the eminent patriot Richard Peters, as well as the quaint old house in which David Rittenhouse, the famous astronomer, was born.

FIG. 61. *The Monongahela River as seen from the wharf at Pittsburg. This stream flows through a fine valley rich in deposits of coal; its banks are lined with coal tipples, and innumerable barges laden with coal throng its waters.*

Pittsburg, the county seat of Allegheny County, is the second city in the state and the first in importance in western Pennsylvania. Situated at the forks of the Ohio, formed by the union of the Allegheny and Monongahela rivers, it is 275 miles west from the city of New York, 350 miles from Cincinnati, and 450 miles east from Chicago. It stands, indeed, as a great "tollgate" on the highway of the United States between the East and the West.

Its industrial interests are preëminent, growing out of unrivaled transportation by river and rail and its proximity to vast deposits of coal, petroleum, and natural gas. Like a great converter, Pittsburg takes the ore, the crude oil, the cotton, the glass-sand, and other raw materials from field, forest, and mine and changes them into commercial commodities of great value. Over the waterways and railroads leading in and out of this busy district passes annually a tonnage of freight twice as great as that of any other city. Sixteen railroads center here and more than 8,000 loaded freight cars enter or depart from Pittsburg daily, while the river craft of the city exceed in tonnage and capacity that of the vessels of any seaport or lake harbor of the United States. (Figs. 61 and 63.)

Pittsburg is the greatest iron and steel producing center in the United States. Its other leading manufactures are foundry and machine shop products, electrical apparatus and supplies, architectural and ornamental iron work, iron and steel pipe, and glass.

From a village of 1,500 inhabitants in 1800 Pittsburg had become by 1900 one of the greatest industrial cities in the world, with a population exceeding 300,000. Sharing the excellent natural advantages that have been the source of Pittsburg's prosperity are many populous manufacturing centers that have sprung up all along the rivers near the city; the marvelous development of the Pittsburg district being without a parallel in the industrial world. In 1906 an act was passed providing for the annexation of Allegheny and other near-by suburban places to Pittsburg. This was approved by the people, and the law went into effect in 1907.

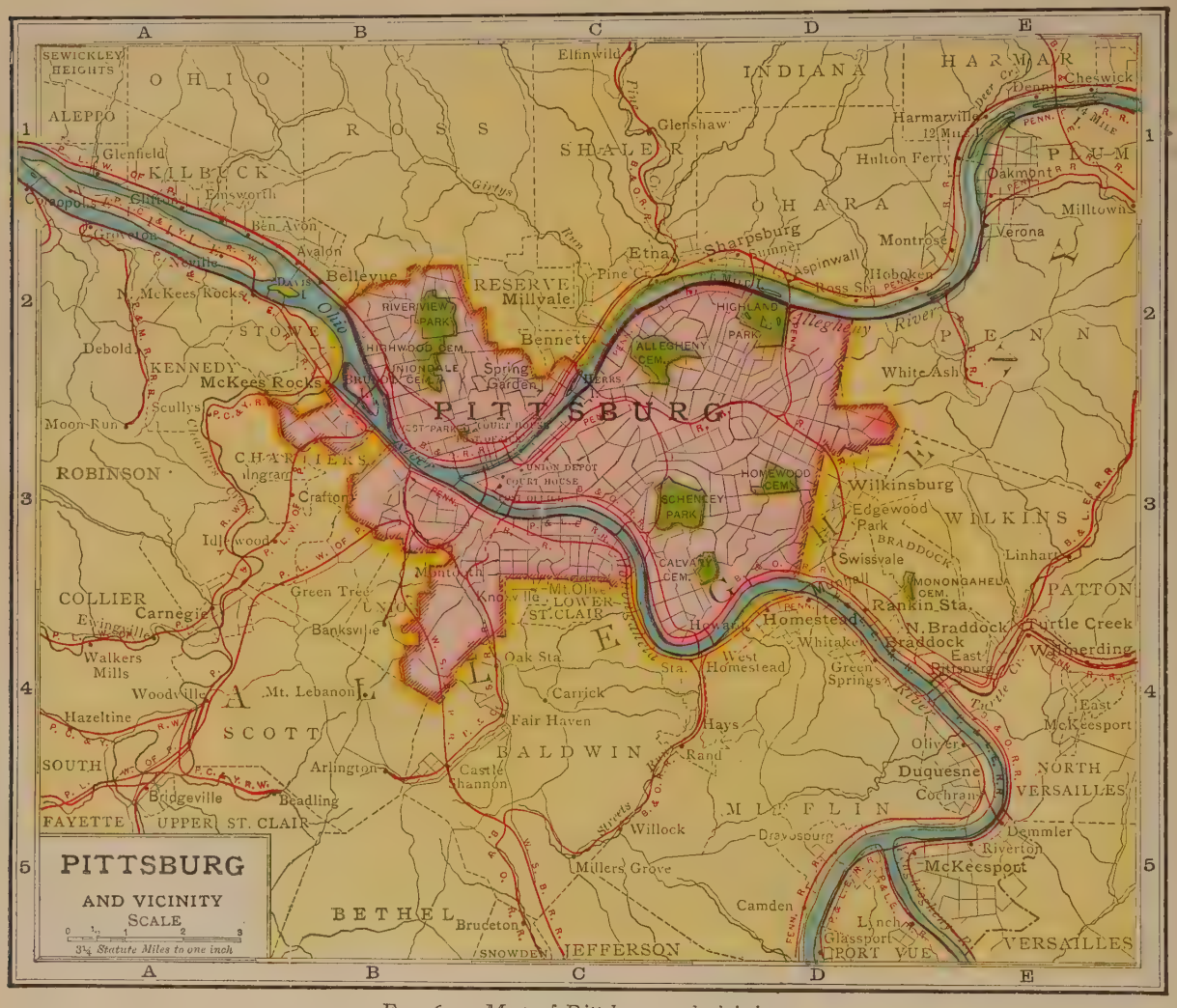

FIG. 62. *Map of Pittsburg and vicinity.*

Allegheny was then the third city in the state. Separated from Pittsburg only by the Allegheny River, it always had the same reasons for growth which had made Pittsburg. Growing skill in road and bridge building soon made the river less and less a real separation. Great industrial establishments grew up on either side of the three rivers about Pittsburg, and numerous bridges had long made the whole region one great commercial and industrial community in fact, as the law now made them one in name. The Allegheny Observatory, the Western University of Pennsylvania, and the several theological schools became Pittsburg institutions, while the added population gave the city its real rank among the large cities of the world. (Fig. 62.)

Scranton, the county seat of Lackawanna County, is fourth in size among the cities of Pennsylvania. It has an area of about twenty-five miles, is finely located, and surrounded by beautiful scenery. Lying in the heart of the upper measures of the anthracite region, it is a natural distributing point and has become a great railroad center.

The rapid growth of the city is due primarily to the mining of coal. The abundance of fuel invited manufactures, and many flourishing industries now contribute to the city's commercial and financial interests. Fully $30,000,000 is em-

ployed in these industries, chief of which, aside from coal mining, are the manufacturing of iron and steel, lace, silk and silk goods, knit goods, and of all kinds of foundry and machine shop products from locomotives to nuts and bolts.

FIG. 63. *A view of Pittsburg along the Monongahela River frontage.*

Reading, the county seat of Berks County, is picturesquely situated on the Schuylkill where the river has cut its way through the South Mountain. Located in a rich agricultural district, and near vast stores of anthracite and iron ore, Reading early became a great manufacturing center. Its iron and steel interests are extensive, and its railroads noteworthy. Its manufactories include rolling mills, sheet iron, boiler plate, car, tube, and carriage-wheel works. Other industries are the making of fur hats, woolen, cotton, and silk goods. Mount Penn and Neversink Mountains, near the city, afford magnificent views of the Schuylkill and Lebanon valleys and are attractive summer resorts much frequented by health and pleasure seekers.

Erie, the county seat of Erie County, on Lake Erie, has one of the best harbors on the Great Lakes. (Fig. 64.) It is protected for six miles by the peninsula of Presque Isle, and the city has an extensive lake trade. It also has numerous railroads. It is a receiving point for iron and copper from the Lake Superior region and lumber from Canada, sending westward in return large cargoes of coal. The natural outlet for immense quantities of coal and coke from adjacent coal fields and with large supplies of natural gas in the vicinity, it is greatly favored for commercial and industrial growth. Among its industrial works are tanneries, chemical works, planing and flouring mills, manufactories for pianos and organs, engines and boilers. The city, laid out in 1795, stands on the site of the old French fort, Presque Isle, built in 1753. It was the headquarters of Commodore Perry, and from here he sailed to defeat the British in the battle of Lake Erie in 1813.

FIG. 64. *A view of the harbor and ore docks at Erie. Owing to the advantages of its situation and its fine harbor, the port of Erie plays a most important part in the shipping of the Great Lakes.*

Wilkes-Barre, the county seat of Luzerne County, is situated on the Susquehanna in the beautiful Valley of Wyoming, a region of unusual attractiveness. Near the city are many reminders of Colonial and Revolutionary periods, including the Wyoming Monument (Fig. 65), marking the site of the conflict of July 3, 1778, the Old Forty Fort Church erected in 1808, and Queen Esther's Park. Wilkes-Barre is the chief industrial and trade center of the most productive anthracite field in the world. Its industries, widely diversified, include the making of mining machinery, cutlery, silk, and lace. The city, founded in 1769, was named in

honor of John Wilkes and Colonel Isaac Barre, stirring advocates for the Colonists in the British Parliament.

Harrisburg, the capital of Pennsylvania and the county seat of Dauphin County, is beautifully situated on the east bank of the Susquehanna 105 miles northwest of Philadelphia. The river, which, a short distance north, breaks through the Blue Mountains, is here a mile wide and is spanned by five fine bridges. The city, surrounded by a good agricultural district, is an important railroad center and the seat of many flourishing industries. Its manufactories include iron and steel works and machine shops. The capitol buildings are in a beautiful park of about sixteen acres. (Fig. 51.) Here the legislature meets every two years and here are the Supreme Court and other departments of the state government. The State Library, founded 1790, contains over 100,000 volumes.

FIG. 65. *Wyoming Monument, marking the site of the massacre of 1778.*

Lancaster, the county seat of Lancaster County, sixty-eight miles west of Philadelphia, is situated in one of the most productive agricultural districts of the United States. Tobacco growing is a flourishing industry in the surrounding country, and the city has an extensive trade in this article. Two railroads afford ample facilities for trade. Among its industrial interests are foundries, cotton mills, and tanneries. Lancaster is the seat of Franklin and Marshall College, and four miles distant, connected by trolley, is Millersville, the seat of the first State Normal School for Pennsylvania. From 1799 to 1812 Lancaster was the capital of the state. This city was the home of James Buchanan and Thaddeus Stevens.

FIG. 66. *Silk mills at Allentown. In America only Paterson, N. J., rivals Allentown in the production of silks.*

Altoona, at the eastern base of the Allegheny Mountains, 117 miles east of Pittsburg, is the largest city of Blair County. The city founded in 1850 by the Pennsylvania Company is a typical railroad town. It is situated on the main line of the road and its industrial interests are largely identified with those of the company. It is the home of thousands of men employed in the immense shops of the railroad. Large silk mills are located here. Just west of the city is the famous "Horseshoe Curve." (Fig. 67.)

Johnstown, Cambria County, seventy-six miles east of Pittsburg, lies at an altitude of about 1,200 feet in a narrow, irregular valley formed by the confluence of Stony Creek and the Conemaugh River. In 1889, as a result of heavy rains, a dam twelve miles west of the city, broke, releasing Conemaugh Lake and causing the great "Johnstown Flood." The city was nearly destroyed and several thousand citizens were drowned. Having good railroad facilities and large deposits of coal the city rapidly recovered from the disaster and is to-day one of the most prosperous industrial centers in the state. Its interests center chiefly in iron and steel.

Allentown, the county seat of Lehigh County, is situated on the Lehigh River. It is an important railroad center, near the great slate and cement district. Allentown has large manufactories for iron, steel, cement, thread, silk, (Fig. 66) and furniture. Trolley lines connect it with Philadelphia on the south, Slatington, Nazareth, Bangor, and Easton north and east. It is the seat of Muhlenberg College (Lutheran), and of Allentown College for women.

McKeesport, on the east bank of the Monongahela River at the mouth of the Youghiogheny, is fifteen miles southeast of Pittsburg. Situated in the great natural gas and bituminous coal district, with abundant water power and excellent transportation, both by river and rail, it has become the seat of large and important industries. Coal mining and the manufacture of iron and steel lead in importance.

Chester, the oldest town in Pennsylvania, is on the Delaware River fourteen miles southeast of Philadelphia. With excellent railroad facilities, an extensive river front, and abundance of fuel close at hand, it has had a rapid industrial development. It is especially noted for its shipbuilding and steel casting. Chester is the seat of the Pennsylvania Military College, and at Upland, just without the city is Crozer Theological Seminary. Of historic interest are the City Hall, and the old Pusey house, frequently visited by William Penn. (Fig. 67.)

FIG. 67. *The City Hall—old Court House—at Chester, built 1724.*

York, the county seat of York County, ninety-four miles west of Philadelphia, is situated in a farming region of great fertility. It is an important industrial center having extensive manufactures. Foundry and machine shop products, tobacco, cigars and cigarettes, paper hangings, iron and steel lead in importance. In 1777–1778, the Continental Congress, driven from Philadelphia by the approach of Howe's army, met here.

Williamsport, the county seat of Lycoming County, is finely situated on the West Branch of the Susquehanna. Lying at an elevation of more than 500 feet, it is one of the most healthful cities of the Union. The tributary country is rich in grain, timber, and minerals, and flourishing and widely diversified industries naturally result. It is at the junction of three railroad lines and is the greatest industrial and chief commercial center of northern Pennsylvania.

Newcastle, the county seat of Lawrence County, has had a phenomenal growth in recent years. It is the trade center of a fine agricultural region, rich in deposits of coal, glass-sand, clay, limestone, and sandstone. Its industries include a large tin plate mill and two glass factories.

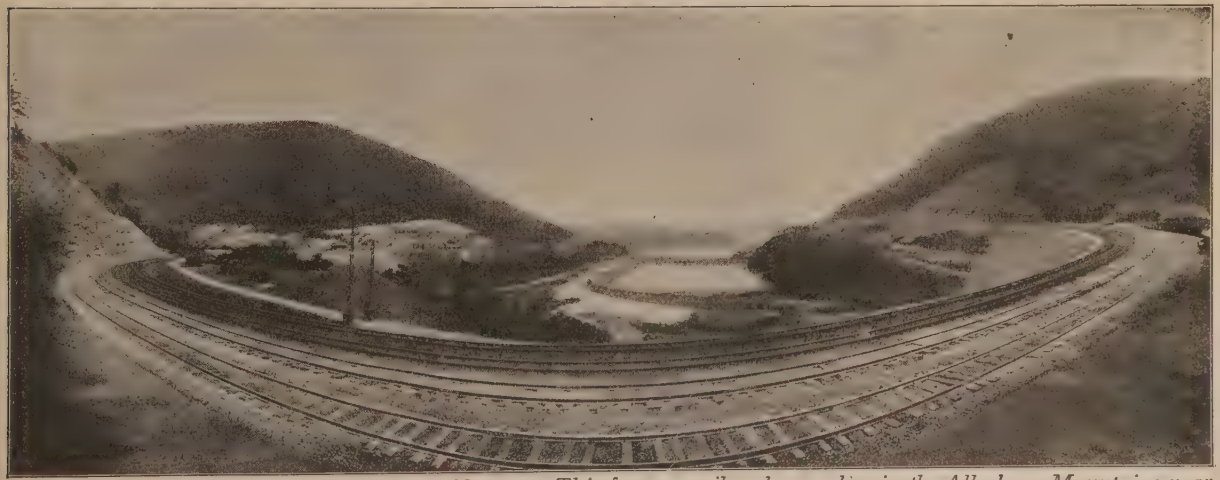

FIG. 68. *The great Horseshoe Curve near Altoona. This famous railroad curve lies in the Allegheny Mountains near the divide of the Atlantic and Mississippi at an elevation of about 1,600 feet.*

Easton, the county seat of Northampton County, at the confluence of the Delaware and Lehigh rivers, is the center of five railroads. It lies near great deposits of cement rock, slate, and coal, and has manufactures of mining machinery, railroad supplies, organs, silk, hosiery, rope, and twine. Here is the seat of Lafayette College.

Norristown, the county seat of Montgomery County, is on the Schuylkill, seventeen miles northwest of Philadelphia. With unequaled railroad facilities and a tributary country rich in iron, limestone, and marble, it has become the seat of various flourishing industries. Among these are iron and steel works, woolen and flouring mills, hosiery and knit goods, factories, foundries and machine shops. Six miles distant is historic Valley Forge. (Figs. 20 and 72.)

Shenandoah, Schuylkill County, owes its prosperity to its situation in the Schuylkill coal region, one of the richest of the great anthracite fields. (Fig. 31.) It has good railroad facilities and a vast trade in coal. Abundant fuel has resulted in various manufactures.

Shamokin, in Northumberland County is situated in a rich anthracite district at the junction of three railroads. Coal mining and manufactories for knit goods, shirts, silks, stockings, and brick are the chief industries.

Lebanon, the county seat of Lebanon County, is within four miles of the Cornwall Iron Mines, and adjacent to abundant supplies of limestone, sandstone, and brick clay. Here mining, quarrying, and the manufacture of brick, iron, steel, and textiles are the chief activities.

Pottsville, the county seat of Schuylkill County, is on the Schuylkill River in a region noted for its beauty. It lies in the center of the anthracite fields in the Schuylkill basin and has a large trade in coal. Here are coal mines, steel works, and railroad shops. (Fig. 69.)

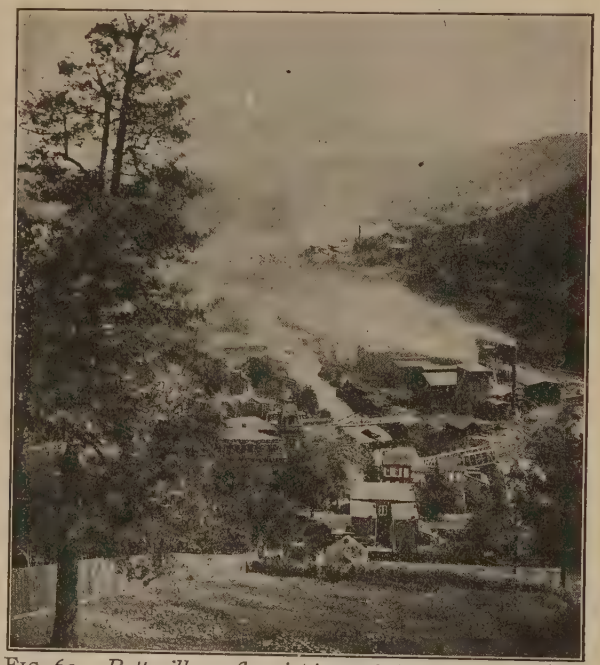

FIG. 69. *Pottsville, a flourishing mining and industrial town in the Schuylkill Valley.*

Braddock, Allegheny County, is on the Monongahela River ten miles east of Pittsburg. It has extensive manufactures of steel, wire, pig iron, steel rails, cement, and plaster. It is on the site of Braddock's defeat, 1756.

Bradford, McKean County, is in the petroleum and gas region. Its manufacturing industries include oil well machinery, gas-engine, glass, terra-cotta and cutlery works, oil well refineries, and lumber mills. The great Kinzua Bridge, 300 feet high and 2,100 feet long, is near the city.

Hazleton, Luzerne County, 114 miles northwest of Philadelphia, is beautifully situated at an elevation of 1,624 feet. It lies in the Lehigh basin of the anthracite region and is extensively engaged in mining and manufacturing.

Pottstown is a flourishing industrial center in Montgomery County. It has rolling mills, bridge works, furnaces, nail works, and foundries. Here is the celebrated Hill School.

Plymouth, Luzerne County, on the Susquehanna, was the first settlement in the Wyoming Valley. It lies in the great anthracite field and from Plymouth to points along the Susquehanna went the first shipments of coal from this now widely known locality. With East Plymouth it forms a large and busy mining and industrial community.

Carbondale, Lackawanna County, is situated on the Lackawanna River at the junction of three railroads. Situated in the great anthracite region immense quantities of coal are mined and shipped. It is the seat of flourishing manufactories and of railroad repair shops and machine works.

Mahanoy City, Schuylkill County, is in the valley of the Broad Mountain and in the southern basin of the anthracite coal fields. Coal mining is the chief industry, but abundant fuel and good shipping facilities have favored manufactures which include iron, stationary engines, flour, and hosiery.

Oil City, Venango County, on the Allegheny River in the center of the great petroleum fields of western Pennsylvania, is the great trade center for the oil region. It has oil refineries, manufactures of oil well supplies, tubing, boilers, and other flourishing industries.

FIG. 70. *Along the Susquehanna River where it breaks through the mountains near Pittston, one of the chief cities on this stream.*

South Bethlehem, Northampton County, on the Lehigh River, is the seat of vast iron and steel industries. Here is Lehigh University (Fig. 71) and a well known school for girls.

Mt. Carmel, Northumberland County, 138 miles north of Philadelphia, is in the Schuylkill coal region. Coal is mined and shipped, and there are flourishing manufactures of mining machinery and miners' supplies.

Pittston, Luzerne County, is on the Susquehanna (Fig. 70) at its confluence with the Lackawanna. It lies in the Wyoming Valley in the heart of the anthracite region. Coal is mined extensively, and excellent railroad facilities with cheap fuel have resulted in various manufactures.

Homestead, Allegheny County, on the Monongahela River, has the largest steel plant in the Union. It employs more than 6,000 men. In 1892 Homestead was the scene of one of the greatest strikes that has occurred in the history of organized labor.

Columbia, Lancaster County, on the Susquehanna River, in a region of great fertility, is a busy trade and shipping center. Among varied industrial interests it has iron furnaces, rolling mills, and manufactures of machinery. The river here, a mile wide, is spanned by one of the longest bridges in the United States.

Nanticoke, Luzerne County, is on the North Branch of the Susquehanna River, in the famous Wyoming Valley. Lying in the midst of immense coal fields, the leading industry is the mining and shipping of coal.

Steelton, Dauphin County, is on the Susquehanna River, about three miles east of Harrisburg. Great steel works located here extend for nearly five miles in an almost continuous stretch of furnaces, forges, and rolling mills.

FIG. 71. *The Library and Gymnasium buildings, Lehigh University, at South Bethlehem.*

Wilkinsburg, Allegheny County, is an attractive residence town adjacent to Pittsburg. Its business interests are largely mercantile.

Butler, the county seat of Butler County, lies in a district rich in oil, gas, and coal. Excellent shipping facilities and abundant fuel favor industrial growth. Glass manufactures, including the making of bottle and plate glass, and steel car works, are the chief industries.

Meadville, Crawford County, on French Creek, is an important market and manufacturing center of western Pennsylvania. It lies in a fertile agricultural region and has a good trade in lumber, dairy products and grain. Here are large machine shops and railroad car works.

Beaver Falls, Beaver County, is on the Beaver River at the intersection of two railroads. Coal and natural gas abound in the vicinity, and Beaver Falls has become an important manufacturing center with extensive steel, pottery, glass, cork, chemical, and bridge works, rolling, planing, and tube mills, and other works. Geneva College is located at College Hill, a suburb.

Sunbury, the county seat of Northumberland County, on the Susquehanna River, is an important railroad and industrial center. It has flouring, planing, and silk mills, casket works, a foundry, and machine and railroad shops. Within the borough limits is Fort Augusta, erected in 1756.

FIG. 72. *Washington's neaaquarters at Valley Forge.*

Carlisle, the county seat of Cumberland County, is in the fertile Cumberland Valley. Its industrial establishments include machine shops and shoe and paper-box factories. Important historic events connected with the Revolution and the Civil War center about this city. The Indian Industrial School, occupying the Revolutionary "Barracks," in both industrial and academic lines, is considered the best in the United States. Here also is Dickinson College.

West Chester, the county seat of Chester County, is in a farming section of unrivaled fertility and has various agricultural implement works. It is the seat of the State Normal School of the First District. The old Turk's Head Hotel here dates from pre-Revolutionary times.

Dubois, Clearfield County, is a busy industrial center near productive coal mines. Its principal industrial interests are centered in coal mining and the manufacture of lumber.

Phœnixville, Chester County, at the junction of French Creek and the Schuylkill River, is a manufacturing and distributing center. Around it have grown up great iron and boiler works, notable bridge works, silk, underwear, and hosiery mills.

Duquesne, Allegheny County, is situated on the Monongahela River twelve miles south of Pittsburg. The industries of the town center chiefly in the great steel works and blast furnaces located here.

Sharon, Mercer County, is on the Shenango River seventy-five miles northwest of Pittsburg. Excellent transportation and abundant supplies of cheap fuel near by have resulted in varied manufactures. The steel and iron industries are important. The manufactures include boilers, nails, spokes, chains, stoves, tin plate, pig-iron, steel plate, and ordnance supplies.

Chambersburg, the county seat of Franklin County, is pleasantly situated on the Conococheague Creek in the beautiful and fertile Cumberland Valley. Its manufactures include milling machinery engines and boilers, shoes, hosiery, flour, furniture, gloves, and paper. Large railroad shops are located here.

Titusville, Crawford County, on Oil Creek, eighteen miles north of Oil City, lies in the great petroleum region and is actively engaged in refining and shipping oil. Local conditions encouraged manufacturing, and here are iron, radiator and cutlery works, engine, boiler and steel works, silk, saw, and planing mills.

Warren, the county seat of Warren County, is a rapidly growing industrial town on the north bank of the Allegheny River at the mouth of the Conewango. It has good railroad facilities, lies in a region rich in oil and natural gas, and

is the seat of seven large oil refineries and eight iron and steel works. At Warren is a state hospital for the insane.

Danville, the county seat of Montour County, is on the North Branch of the Susquehanna River, at the foot of Montour Ridge. Here was built the first plant for the manufacture of railroad iron in Pennsylvania. There are also stove works and several rolling mills. A State Insane Asylum is located here.

Washington, the county seat of Washington County, is in the center of a highly productive oil and coal region and is the seat of varied manufactures. Here is located Washington and Jefferson College.

Uniontown, the county seat of Fayette County, is at the junction of two railroads. The surrounding country is rich in coal, and large and varied industries have grown up here.

FIG. 73. *An interesting scene at Connellsville, the center of the Coke Industry. Here may be seen the coke ovens, the way the coal is carried to the ovens, and the coke being loaded on cars for transportation.*

Carnegie, Allegheny County, is picturesquely located in the Chartiers Valley in a region underlaid with coal. Extensive manufactures, including the production of iron, steel, lead, and glass, are centered at Carnegie. Coal is mined and shipped.

Franklin, the county seat of Venango County, beautifully located on the Allegheny River at the mouth of French Creek, owes its prosperity largely to its situation in the oil region and to its excellent railroad facilities. It has extensive oil refineries and various manufactures. Franklin occupies the site of Ft. Venango, built by the French in 1753.

Bethlehem, Northampton County, is a great and growing industrial center on the Lehigh River, fifty-six miles north of Philadelphia. It has large steel, zinc, and graphite works, and silk and knitting mills. Here are made some of the largest guns in the world. Armor plate is also made in the Bethlehem mills by the Krupp process. Bethlehem was founded by the Moravians in 1742. In 1777 and 1778 the general hospital of the Continental Army was here, and here were buried 500 soldiers of the army.

Tamaqua, Shuylkill County, lies on the Little Schuylkill River at the junction of two railroads. It has extensive coal mining interests and manufactures of foundry and machine shop products, stoves, powder, flour, shoes, furniture, knit goods, and beer.

Lock Haven, the county seat of Clinton County, is in a good agricultural and lumbering district twenty-eight miles southwest of Williamsport. It has excellent transportation facilities and is a flourishing trade center. It exports pine lumber and has large pulp and paper mills, tanneries, and furniture factories. The State Normal School of the Eighth District is located at Lock Haven.

Connellsville, Fayette County, on the Youghiogheny River, in the coal country, southeast of Pittsburg is the center of the greatest coke manufacturing region in the world. (Fig. 73.) The industry employs nearly $15,000,000 and engages about 8,000 people. Its industries include a machine shop, and tin plate and automobile works.

Bristol, a thriving manufacturing town in Bucks County, is situated on the Delaware. Machine shops, rolling and worsted mills, and manufactories for hosiery, carpets, and paper hangings are among its industrial interests. It was a station of the Federal army during the Revolution. Near by is a noted mineral spring.

The Counties of Pennsylvania.

COUNTY	ORGANIZED	LAND AREA, SQ. M.	POPULATION, 1910	COUNTY SEAT	POPULATION, 1910
Adams	1800	537	34,319	Gettysburg	4,030
Allegheny	1788	758	1,018,463	Pittsburg	533,905
Armstrong	1800	640	67,880	Kittanning	4,311
Beaver	1800	426	78,353	Beaver	3,456
Bedford	1771	1,070	38,879	Bedford	2,235
Berks	1752	874	183,222	Reading	96,071
Blair	1846	530	108,858	Holidaysburg	3,734
Bradford	1810	1,140	54,526	Towanda	4,281
Bucks	1682	620	76,530	Doylestown	3,304
Butler	1800	765	72,680	Butler	20,728
Cambria	1804	680	166,131	Ebensburg	1,978
Cameron	1860	375	7,644	Emporium	2,916
Carbon	1843	400	52,846	Mauch Chunk	3,952
Center	1800	1,130	43,424	Bellefonte	4,145
Chester	1682	760	109,213	West Chester	11,767
Clarion	1839	566	36,638	Clarion	2,612
Clearfield	1804	1,141	93,768	Clearfield	6,851
Clinton	1839	892	31,545	Lock Haven	7,772
Columbia	1813	480	48,467	Bloomsburg	7,413
Crawford	1800	1,020	61,565	Meadville	12,780
Cumberland	1750	536	54,479	Carlisle	10,393
Dauphin	1785	514	136,152	Harrisburg	64,186
Delaware	1789	178	117,006	Media	3,562
Elk	1843	760	35,871	Ridgeway	5,408
Erie	1800	782	115,517	Erie	66,525
Fayette	1783	824	167,449	Uniontown	13,344
Forest	1848	420	9,435	Tionesta	803
Franklin	1784	731	59,775	Chambersburg	11,800
Fulton	1850	416	9,703	McConnellsburg	579
Greene	1796	588	28,882	Waynesburg	7,199
Huntingdon	1787	940	38,304	Huntingdon	6,861
Indiana	1803	820	66,210	Indiana	5,749
Jefferson	1804	620	63,090	Brookville	3,003
Juniata	1831	398	15,013	Mifflintown	954
Lackawanna	1878	470	250,570	Scranton	129,867
Lancaster	1729	960	167,029	Lancaster	47,227
Lawrence	1849	360	70,032	Newcastle	36,280
Lebanon	1813	370	59,565	Lebanon	19,240
Lehigh	1812	328	118,832	Allentown	51,913
Luzerne	1786	910	343,186	Wilkes-Barre	67,105
Lycoming	1795	1,240	80,813	Williamsport	31,860
McKean	1804	976	47,868	Smethport	1,817
Mercer	1800	680	77,699	Mercer	2,023
Mifflin	1789	411	27,785	Lewistown	8,166
Monroe	1836	630	22,941	Stroudsburg	4,379
Montgomery	1784	501	169,590	Norristown	27,875
Montour	1850	142	14,868	Danville	7,517
Northampton	1752	370	127,667	Easton	28,523
Northumberl'd	1772	469	111,420	Sunbury	13,770
Perry	1820	561	24,136	New Bloomfield	*772
Philadelphia	1682	130	1,549,008	Philadelphia	1,549,008
Pike	1814	620	8,033	Milford	872
Potter	1804	1,049	29,729	Coudersport	3,100
Schuylkill	1811	789	207,894	Pottsville	20,236
Snyder	1855	320	16,800	Middleburg	531
Somerset	1795	1,040	67,717	Somerset	2,612
Sullivan	1847	470	11,203	Laporte	245
Susquehanna	1810	823	37,746	Montrose	1,914
Tioga	1804	1,180	42,829	Wellsboro	3,183
Union	1813	316	16,240	Lewisburg	3,081
Venango	1800	671	56,359	Franklin	9,767
Warren	1800	860	39,593	Warren	11,086
Washington	1781	830	143,680	Washington	18,778
Wayne	1798	834	29,236	Honesdale	2,945
Westmoreland	1773	1,060	231,304	Greensburg	13,012
Wyoming	1842	409	15,509	Tunkhannock	1,508
York	1749	875	136,405	York	44,750

*Estimated 1910.

The Average Annual Precipitation Recorded at Twelve Principal Stations in Pennsylvania for Periods of from Seventeen to Eighty-five Years.

STATIONS	LATITUDE	LONGITUDE	ELEVATION, FEET	RECORD	YEARS	INCHES
Altoona	40°32′	78°24′	1,182	1859–1901	17	33.44
Bethlehem	40°36′	75°23′	237	1877–1900	21	43.29
Carlisle	40°12′	77°14′	480	1830–1900	22	41.84
Confluence	39°57′	79°26′	1,325	1874–1901	25	45.26
Emporium	41°30′	78°15′	1,050	1889–1901	13	44.15
Erie	42°07′	80°05′	713	1873–1901	28	39.27
Gettysburg	39°49′	77°15′	624	1839–1895	25	39.07
Harrisburg	40°16′	76°52′	374	1877–1901	24	41.60
Lewisburg	40°58′	76°55′	450	1850–1901	10	41 25
Philadelp'a	39°57′	75°09′	117	1708–1901	85	41.47
Pittsburg	40°33′	80°02′	842	1836–1901	57	35.68
Warren	41°57′	79°14′	1,137	1885–1901	17	43.18

The Larger Cities and Their Population for Seven Decades.

CITIES	1910	1900	1890	1880	1870	1860	1850
Philadelphia	1,549,008	1,293,697	1,046,964	847,170	674,022	565,519	121,276
Pittsburg	533,905	451,512	343,904	156,389	86,076	49,217	46,601
Scranton	129,867	102,026	75,215	45,850	35,092	9,223	.....
Reading	96,071	78,661	58,661	43,278	33,030	23,162	15,743
Wilkes-Barre	67,105	51,721	37,718	23,339	10,174	4,229	2,723
Erie	66,525	52,733	40,634	27,737	19,646	9,419	5,858
Harrisburg	64,186	50,167	39,385	30,762	23,104	13,405	7,834
Johnstown	55,482	35,936	21,805	8,380	6,028	4,185	1,269
Altoona	52,127	38,973	30,337	19,710	10,610	3,591	.....
Allentown	51,913	35,416	25,228	18,663	13,884	8,025	3,779
Lancaster	47,227	41,459	32,011	25,769	20,233	17,603	12,369
York	44,750	33,708	20,793	13,940	11,003	8,605	6,863
McKeesport	42,694	34,227	20,741	8,212	2,523	2,166	1,392
Chester	38,537	33,988	20,226	14,997	9,485	4,631	1,667
Newcastle	36,280	28,339	11,600	8,418	6,164	1,872	1,614
Williamsport	31,860	28,757	27,132	18,934	16,030	5,664	1,615
Easton	28,523	25,238	14,481	11,924	10,987	8,944	7,250
Norristown	27,875	22,265	19,701	13,063	10,753	8,848	6,024
Shenandoah	25,774	20,321	15,944	10,147	2,951	.....	.....
Hazleton	25,452	14,230	11,872	6,935	4,317	1,707	.....
Butler	20,728	10,853	8,734	3,163	1,935	1,399	1,148
Pottsville	20,236	15,710	14,117	13,253	12,384	9,444	7,515
S. Bethlehem	19,973	13,241	10,302	4,925	3,556	.....	.....
Shamokin	19,588	18,202	14,403	8,184	4,320	.....	.....
Braddock	19,357	15,054	8,561	3,310	1,290	.....	.....
Lebanon	19,240	17,628	14,664	8,778	6,727	4,469	2,184
Wilkinsburg	18,924	11,886	4,662	.....	.....	.....	.....
Washington	18,778	7,670	7,063	4,292	3,571	3,587	2,662
Nanticoke	18,877	12,116	10,044	3,884	.....	.....	.....
Homestead	18,713	12,554	7,911	.....	.....	.....	.....
Dunmore	17,615	12,583	8,315	5,151	4,311	.....	.....
Mt. Carmel	17,532	13,179	8,254	2,378	1,289	.....	.....
Carbondale	17,040	13,536	10,833	7,714	6,393	.....	4,955
Plymouth	16,996	13,649	9,344	6,065	2,684	.....	.....
Pittston	16,267	12,556	10,302	7,472	6,760	3,682	.....
Mahanoy City	15,936	13,504	11,286	7,181	5,533	.....	.....
Duquesne	15,727	9,036	.....	.....	.....	1,720	870
Oil City	15,657	13,264	10,932	7,315	2,276	.....	.....
Pottstown	15,599	13,696	13,285	5,305	4,125	2,380	1,664
Sharon	15,270	8,916	7,459	5,684	4,221	900	541
McKees Rocks	14,702	6,352	1,687	.....	.....	.....	.....
Bradford	14,544	15,029	10,514	9,167	1,446	1,515	976
Steelton	14,246	12,086	9,250	2,477	.....	.....	.....
Sunbury	13,770	9,810	5,930	4,077	3,131	1,803	1,218
Uniontown	13,344	7,344	6,359	3,265	2,503	.....	2,333
Greensburg	13,012	6,508	4,202	2,500	1,642	1,388	1,051
Connellsville	12,845	7,160	5,629	3,609	1,292	996	.....
Bethlehem	12,837	7,293	6,762	5,103	4,512	2,866	1,516
Meadville	12,780	10,291	9,520	8,860	7,103	3,602	2,578
Dubois	12,623	9,375	6,149	2,718	.....	.....	.....
Beaver Falls	12,191	10,054	9,735	5,104	3,112	.....	.....
N. Braddock	11,824	6,535	.....	.....	.....	.....	.....
Chambersburg	11,800	8,864	7,863	6,877	6,308	5,255	3,335
Monessen	11,775	2,197	.....	.....	.....	.....	.....
West Chester	11,767	9,524	8,028	7,046	5,630	4,757	3,172
Columbia	11,454	12,316	10,599	8,312	6,401	4,998	4,140
Old Forge	11,324	5,630	.....	.....	.....	.....	.....
Coatesville	11,084	5,721	3,680	2,766	2,025	.....	.....
Warren	11,080	8,043	4,332	2,810	2,014	1,738	1,013
Phœnixville	10,743	9,196	8,514	6,682	5,292	4,886	2,670
Carlisle	10,303	9,626	7,620	6,209	6,650	5,664	4,581
South Sharon	10,190	.....	.....	.....	.....	.....	.....
Carnegie	10,009	7,330	.....	.....	.....	.....	.....
Franklin	9,767	7,317	6,221	5,010	3,908	1,303	936
Charleroi	9,615	5,930	.....	.....	.....	.....	.....
Tamaqua	9,462	7,267	6,054	5,730	5,960	4,917	3,080
Dickson City	9,331	4,948	3,110	838	391	.....	.....
Bristol	9,256	7,104	6,553	5,273	3,269	2,187	1,810
Larksville	9,288	.....	.....	.....	.....	.....	.....
Taylor	9,060	4,215	.....	.....	.....	.....	.....
Greater Punxsutawney	9,058	6,746	4,194	.....	.....	.....	.....
Latrobe	8,777	4,614	3,589	1,815	1,127	758	.....
Northampton	8,729	.....	.....	.....	.....	.....	.....
Titusville	8,533	8,244	8,073	9,046	8,630	438	243
Olyphant	8,505	6,180	4,083	2,094	2,327	.....	.....
Edwardsville	8,407	5,165	3,284	.....	.....	.....	.....
New Brighton	8,329	6,820	5,016	3,653	4,037	2,834	1,443
Lansford	8,321	4,888	4,004	2,206	.....	.....	.....
Donora	8,174	.....	.....	.....	.....	.....	.....
Lewistown	8,166	4,451	3,273	3,222	2,737	2,638	2,733
Sharpsburg	8,153	6,842	4,898	3,466	2,176	1,436	1,229
Jeannette	8,077	5,865	3,296	.....	.....	.....	.....
Windber	8,013	.....	.....	.....	.....	.....	.....
Millvale	7,861	6,736	3,809	1,824	668	.....	.....
Lock Haven	7,772	7,210	7,358	5,845	6,986	3,349	835
New Kensington	7,707	4,665	.....	.....	.....	.....	.....
Monongahela	7,598	5 173	4,096	2,904	1,078	999	977
Danville	7,517	8,042	7,908	8,246	8,436	6,385	3,302
Duryea	7,487	5,541	2,904	.....	.....	.....	.....
Conshohocken	7,480	5,762	5,470	4,561	3,071	1,741	727
Milton	7,460	6,175	5,317	2,102	1,909	1,702	1,649
Tarentum	7,414	5,472	4,627	1,245	944	711	509
Bloomsburg	7,413	6,170	4,635	3,702	3,341	.....	.....

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